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4 November 1985

Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION

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WORLDWIDE REPORT

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USSR

WEST EUROPE

SPAIN

JAPAN

BRIEFS

AGREEMENT WITH U.S. ON REACTOR RESEARCH—Tokyo, 28 Sep (KYODO)--Japan and the United States have concluded an arrangement in Tokyo for implementation of their agreement on cooperation in high-temperature gas-cooled nuclear reactor research and development, the Japan Atomic Energy Research Institute said Saturday. The arrangement was signed at the institute Friday by representatives of the governmental body and the U.S. Department of Energy, institute officials said. The temperature inside the reactor is very high, with that at the outlet of the reactor reaching about 1,000 degrees C, and thus can be utilized not only for power generation but also for iron-making, chemical production, hydrogen production, seawater desalination and regional heating, according to the officials. The reactor uses helium gas as its coolant. Development of the next generation of multi-purpose reactors has been continuing among various countries. In the United States, the prototype high-temperature gas-cooled reactor for power generation is now in operation. In Japan, an experimental reactor of that type is being designed so that the reactor will be completed by about 1990. Under the arrangement, researchers from the two countries will conduct joint studies using America's prototype reactor, and will work to develop graphite material for the reactor core structure, the officials said. [Text] [Tokyo KYODO in English 0222 GMT 28 Sep 85]

CSO: 5160/002

BULGARIA

BRIEFS

NUCLEAR PHYSICS INTERNATIONAL SESSION OPENS--Varna, September 22 (BTA)--International session on the problems of nuclear physics was opened here today. Scientific workers and specialists from Bulgaria, the GDR, Poland, Romania, the USSR, Hungary, Great Britain, France, the FRG and other countries will take part in the session. Mr Zhelyu Zhelev, director of the Institute for Nuclear Research and Nuclear Energetics, scientific secretary of the Bulgarian Academy of Scientists, said that prominent scientists from Dubna and other scientific-research institutes will deliver reports on the latest directions in this field. Problems in connection with the structure of the atomic nucleus and its properties, the thermal nuclear synthesis and energetic reactors will be discussed. [Text] [Sofia BTA in English 1845 GMT 22 Sep 85]

CSO: 5100/3001

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YUGOSLAVIA

STANDARDS FOR OBTAINING, PROCESSING NUCLEAR RAW MATERIALS

Belgrade SLUZBENI LIST SFRJ in Serbo-Croatian No 39, 26 Jul 85 pp 1173-1179

[Regulation issued by Vukasin Dragojevic, director of the Federal Bureau of Standards, in Belgrade on 29 June 1984: "Regulation on Technical Standards for Prospecting, Mining and Processing Nuclear Raw Materials"]

[Text] I. General Provisions

Article 1

This regulation prescribes the conditions and requirements which must be met by facilities intended for the prospecting, mining and processing of nuclear raw materials except open-pit mines of those raw materials; work procedures and other procedures in conducting operations in the prospecting, mining and processing of nuclear raw materials; technical safety measures in mining facilities in the conduct of mining operations in the prospecting, mining and processing of nuclear raw materials; the procedure and manner of performance of mandatory technical monitoring of certain devices and installations in those mining facilities and the manner of handling waste products in the prospecting, mining and processing of nuclear raw materials.

The provisions of statutes governing underground mining of ores and nonmetallic minerals shall apply to the prospecting, mining and processing of nuclear raw materials unless this regulation provides otherwise.

Article 2

For the purpose of this regulation "nuclear raw materials" means nuclear raw materials with an average content exceeding 100 grams per ton of uranium or 200 grams per ton of thorium.

In addition to ores, other raw materials such as phosphoric acid, ash, etc., are also understood to be raw materials for obtaining uranium or thorium concentrate.

Article 3

Definitions used in this regulation are as follows:

1) "prospecting of nuclear raw materials" means surface operations (excavations, cuts, side cuts, deep drilling, etc.) and underground mining operations in prospecting a particular mineral deposit to ascertain the reserves;

2) "mining nuclear raw materials" refers to mining operations in opening, developing, preparing and mining the deposits of the nuclear raw materials;

3) "processing nuclear raw materials" means all physical and chemical procedures used in obtaining the concentrate of uranium or thorium;

4) "ore" is a rock which as a rule contains more than 100 grams per ton of uranium or more than 200 grams per ton of thorium;

5) "gangue" means the rock of the ore formation which as a rule contains on the average less than 100 grams per ton of uranium or less than 200 grams per ton of thorium;

6) "solid processing waste" means the tailings which are obtained in treating the ore in the processing phase;

7) "radon" (radioactive gas) refers to radon (Rn^{222}), a daughter product of Ra^{226} (in uranium mines) or thoron-radon (Rn^{220}), a daughter product of $Th\text{-}Ra^{224}$;

8) "daughter products of radon" are as follows:

a) short-lived daughter products of $radon^{222}$:

Po^{218}(RaA); Pb^{214}(RaB); Bi^{214}(RaC) and PO^{214}(ThA);

or the short-lived daughter products of $thoron\text{-}radon^{220}$:

Po^{216}(ThA); Pb^{212}(ThB) and Bi^{212}(ThC) and

b) long-lived daughter products of $radon^{222}$:

Pb^{210}(RaD); Bi^{210}(RaE) and Po^{210}(RaE);

or the long-lived daughter product of $thoron\text{-}radon^{220}$:

Po^{212};

9) "radioactive dust" means the dust created by a nuclear raw material;

10) "areas in use" are areas in which work is done constantly or occasionally, areas intended for the movement of personnel and all areas which are ventilated;

11) "unventilated areas" are areas which are not ventilated;

12) "areas of the main air stream and areas of the branches of the main air stream" are the areas through which the main air streams of the mine or the branches of the main air stream of the mine pass, respectively;

13) "the main intake air stream" is the fresh air stream entering the mine through one or more entries and dividing into the branches of the fresh air stream. Every mine must have one main air stream, but it may also have several main air streams;

14) "the branches of the main air stream" are the segments of the main air stream used to ventilate several work sites;

15) "the exhaust air stream" is the spent air stream leaving the mine through one or more openings;

16) "transport" is the movement of ore or gangue through other areas than the stope;

17) "transport at the stope" refers to the movement of ore and gangue at the stope;

18) "the stope" is that area of the mine where the ore is being excavated and it may have one or more working faces;

19) "the working face of the stope" is that part of the stope or the stope itself at which all the technological operations of excavation are performed;

20) "backward stoping" in the mine refers to excavation in which ore bodies closest to the exhaust air stream of the mine are excavated first;

21) "backward excavation in the stopes" refers to excavation in which parts of the ore body closest to the exhaust air stream of the stope are excavated first;

22) "cracks" are fractures of tectonic or other origin in which radon may accumulate;

23) "the factor of balance of radon and its short-lived radioactive daughter products F" is defined by one of these expressions:

$$F = E_{alpha}(J \cdot m^{-3}):[5.7 \cdot 10^{-9}(J \cdot B_q^{-1}) \cdot C\,(B_q \cdot m^{-3})]$$

or

$$F = (3,700 \cdot RR):(C_R),$$

in which: E_{alpha}—the total alpha energy of the daughter products in J/m^3,
C_R—radon concentration in B_q/m^3,
RR—working levels in WL.

II. Conditions and Requirements for Underground Mine Areas

Article 4

The areas of the entry of the main intake air stream of the mine must be in gangue, and if that is not possible their entire surfaces and length in the ore zone must be insulated with a material guaranteeing the necessary insulation.

As an exception to Paragraph 1 of this article, areas of the main intake air stream which are not in gangue need not be insulated if it has been ascertained by measurements that the concentration of radon and daughter products of radon in the air at the exit from the ore zone is not greater than the concentration at the entry to the ore zone.

Article 5

Facilities in which the ore is loaded and unloaded, stored or crushed may not be placed in the areas of the main intake air stream of the mine.

As an exception location of the facilities referred to in Paragraph 1 of this article in the areas of the main intake air stream is allowed if separate ventilation is provided for, so that the total air stream from those facilities is taken out of the mine directly or to the area of the exhaust air stream of the mine.

Article 6

All drillholes in the areas of the main intake air stream of the mine must be tested, and if separation of radon is ascertained, they must be stopped up.

Article 7

Mine areas such as the pumping station, compressor station, workshop, tool and parts storeroom, mine car storage area, eating areas and similar areas must be built in gangue, and at least 50 percent of the volume of all these areas must be ventilated by a flow-through air stream.

Article 8

As a rule ore may not be transported through the areas of the main intake air stream of the mine and the area of a branch of the main intake air stream.

As an exception the transport of ore is allowed through the areas of the main intake air stream and its branches if those areas have been equipped with devices for prevention of pollution (contamination) or if the measurements show that the relevant technical measures taken prevent radioactive contamination of the main intake air stream and its branches.

The equipment for transport of the ore must be so designed that the ore being carried is not spilled. The ore in the transportation equipment must be covered or wetted so as to prevent the raising of dust during transport.

Continuous transport equipment may not be used in the areas of the main air stream.

Article 9

If transport or haulage equipment passes through the areas of the main intake air stream and its branches under the conditions prescribed by this regulation, the outside dimensions of that equipment may not take up more than 50 percent of the clear cross section of the area through which it moves.

Work Procedures in Mining Nuclear Raw Materials

Article 10

When work is being done simultaneously at several levels, it is not permitted to mix the discharge air streams of one level with the intake air streams of the other levels.

Excavation must be backward toward the spaces of the intake air stream, and the spent air must be led off through the parts of the excavation or deposit where excavation has been completed.

The stope areas must be of such size that at least 80 percent of the clear space of their volume is ventilated by a flow-through air stream.

The gangue obtained in mining operations and transported outside the mine shall be piled in special tailings piles, which must be made safe so that water leaching through them cannot flow into streams before being checked once again.

Article 11

When the cut-and-fill method is used, including hydraulic spreading of the gangue from facilities for processing nuclear raw materials, the impact of the fill material in increasing the emission of radon and increasing the radiation must first be studied. If the fill material increases the concentration of radon in the air, appropriate technical safety measures must be taken in the mine areas which are in use so that the concentrations prescribed for radon or for its short-lived daughter products are not exceeded.

Article 12

Methods of excavation involving storage of the ore may be used only provided that there is constant forced ventilation in all parts of the stope and other technical safety measures are taken so that the concentrations prescribed for radon or its short-lived daughter products is not exceeded.

Article 13

The fresh air stream must reach stopes through areas which have not been made in ore, but if this is not possible, measures must be taken to ensure the necessary insulation from radioactive pollution (contamination).

As an exception to Paragraph 1 of this article the areas of the fresh air stream which have not been made in gangue need not be insulated if measurements show that the concentration of radon and its short-lived daughter products at the entry to the stope is not higher than one-third of the permissible content.

Article 14

Methods of excavation involving caving of the stope area may be used provided the mine or portion of the mine in which these methods are used is ventilated by the compression method and that this is done, if necessary, by separate compression ventilation.

Article 15

Provision must be made for the necessary monitoring of the air where the ore is being loaded (dumped). In areas where ore is loaded there must be ventilation and settlement (blanketing) of the dust, and if this is not possible, provision must be made for separate compressor ventilation of the space with as much air as is necessary to bring the contaminants within the prescribed limits.

Article 16

The presence of radon or of its short-lived daughter products must be checked for every time work begins for all methods of excavation involving extensive blasting. Only when their concentrations are brought within prescribed limits may work be resumed.

Article 17

Ore may also be stored outside the mine in open storage areas provided that those storage areas are away from settlements and remote from other facilities and from the areas of the intake air streams of the mine.

The ore storage areas must have substrata which do not allow water to pass, and before discharge into streams water must be checked so as to ascertain whether it contains uranium, and to purify it if necessary.

The open ore storage areas must be guaranteed against erosion caused either by wind or atmospheric precipitation.

The storage area must be marked with the sign for radioactivity and if necessary surrounded by an appropriate enclosure.

Work Procedures in Ventilating Mines

Article 18

Underground mine areas must have uninterrupted mechanical ventilation during the entire shifts and between shifts while they are being made and during their use.

Article 19

Following every interruption of ventilation lasting longer than 1 hour of underground mine areas being made or in use, the areas must be intensively ventilated until the air in them is changed at least three times before the areas are entered once again and work resumes.

Article 20

Mine areas in which flow-through ventilation is not possible must be separately ventilated when made.

If the compression method of ventilation is used, the available air stream formed at the outlet from the air ducts must reach the forward end of the space.

If the depression method of ventilation is used, the suction part of the ventilation system must be at least 10 meters from the working face.

Article 21

If the compression method of separate ventilation of a work site is used, the fresh air must be taken (sucked in) in an area with a flow-through air stream in which the flow of air is at least 30 percent greater than the amount taken up by the fan.

If the depression method of separate ventilation of a work site is used, the discharge of the spent air must be in an area with flow-through ventilation at a distance guaranteeing prevention of recirculation.

If the combined method of separate ventilation of a work site is used, the end of the air ducts for sucking in the fresh air must be at least 30 meters from the end of the air ducts for discharge of the spent air, assuming the ventilation ducts overlap over that length.

Article 22

The air stream used for separate ventilation of a work site may as a rule contain no more than one-third of the permitted content of radon or its short-lived daughter products.

As an exception to Paragraph 1 of this article, the air stream used for separate ventilation of a work site may contain more than one-third of the permissible content of radon or its short-lived daughter products if this ventilation guarantees that the content of radon or its short-lived daughter products is less than the permissible level at the work site and in the discharge air stream from the work site.

Article 23

Ventilation of a stope in series is prohibited.

Two working faces or more working faces may be ventilated in series at a single stope only if in the air at the faces ventilated in that way there is more radon or its short-lived daughter products than is permissible.

Article 24

The spent air stream must be taken directly from the stope to the discharge air stream of the mine or outside the mine.

Article 25

The fresh air stream may not be brought to the stope through a portion of the stope in which excavation has been completed. As an exception the fresh air stream may be brought to a portion of the stope at which excavation has been completed if appropriate technical safety measures are taken and measurements show that the fresh air stream is not contaminated with radon or its short-lived daughter products by passage through that stope.

The areas of the main branches of the air stream must be unobstructed in their design so that the air flows through and must not contain things, materials, etc., which would diminish the area of the cross section of the space.

Article 26

Ventilation shafts intended for the purpose may be used to bring fresh air to a stope or to take air away from a stope.

Article 27

When nuclear raw materials are being mined in underground mines where regular production is carried on, there must also be a spare fan for the mine's main ventilation.

In mines where two or more fans are used for the main ventilation, a spare fan is not urgently necessary.

Article 28

When the computation is made of the necessary quantities of air for ventilation of an underground mine and all its work sites, the intensity of the emanation of radon and of its daughter products as established by measurement must be taken into account.

The rate of radon emanation obtained by computation may be used for unopen parts of a deposit or for new deposits to calculate the quantities of air necessary for ventilation of work sites, or the condition must be met of six changes of air per hour.

Article 29

The entry of radon into areas in use from unventilated areas must be prevented: by isolation of those areas, by maintaining low pressure in those areas, or by other technical safety measures.

The proper isolation of unventilated area must be checked at least once every 3 months, and the readings entered in the inspection log.

If unventilated areas are opened once again, the content of radon and its short-lived daughter products must be checked.

Article 30

At every excavation work site or work site where prospecting and preparatory operations, drilling and blasting operations, loading or other operations are being performed which create dust, all dry surfaces of the areas in the work zone must be wetted down, or other measures envisaged for preventing the creation of dust must be taken.

Article 31

In areas where a sizable quantity of airborne radioactive dust is created in blasting or other work processes, it must be prevented from entering other areas used as the areas of the fresh air stream.

Work Procedures Related to Drainage

Article 32

All water in mines for nuclear raw materials where operations have been segregated to mine areas in use must be controlled and led off by pipes or covered ditches by the shortest route to sumps in the mine or on the surface.

It is prohibited to collect the water referred to in Paragraph 1 of this article in storage pools.

Article 33

Mines may not be drained by the gravity method in open ditches through the areas of the mine's main intake air stream.

Article 34

Mine water sumps may not be placed in the areas of the mine's fresh air stream.

The sumps referred to in Paragraph 1 of this article may be placed in the areas of the mine's fresh air stream provided they are completely isolated and ventilated so that the discharge air stream from the sumps does not mix with the mine's fresh air stream.

Article 35

If blocked-off areas of a mine are reopened for use, all technical safety measures must be taken to bring contamination within the prescribed limits.

Article 36

Mine water from which radon is emanating may not be used as drilling mud or for sprinkling and wetting down.

Article 37

Groundwater may be lowered from one level to another level by gravity--through a pipe or prepared drillhole.

Article 38

Water must be checked at least once every 3 months at the outlet from a shaft or from the mine in order to establish whether it contains uranium or thorium or radium.

Work Procedures Related To Checking the Proper Working Condition of the Ventilation System

Article 39

The following must be checked constantly in order to verify the correct operating conditions of the ventilation system in the mine:

1) the proportion of the radioactive gas radon or radon's short-lived radioactive isotopes in the air;

2) the proportion of long-lived alpha emitters or uranium or thorium in samples of radioactive dust.

Article 40

Air samples must be taken for regular monitoring of the ventilation system by measuring the proportion of radon or its short-lived daughter products in the mine air as follows:

i. at work sites;

ii. for all the principal phases of operation;

iii. in the exhaust air streams of the stope;

iv. in the exhaust streams of excavation areas;

v. at ventilation stations;

vi. in the areas of the mine's exhaust air stream.

Samples shall be taken at a height of 1.5-1.8 meters in these intervals: at least once a week at work sites, once a year for all the principal technological phases of operation, and once a month at other measuring points.

The factor of balance of radon and its short-lived daughter products should be determined once a month at air stations and air exits and once a year for all the technological phases of operation.

The measuring equipment used to monitor the proportion of radon in the air must meet the sensitivity requirements of 0.037 B_q/1 of air.

Article 41

Regular monitoring of the ventilation system by measuring the short-lived daughter products of radon shall be done at the points and under the conditions enumerated in Article 40 of this regulation, but the equilibrium factor shall not be determined for the technological phases of operation.

The measuring equipment used to monitor the proportion of short-lived daughter products of radon must meet the sensitivity standard of 0.037 B_q/1 of air.

Article 42

Samples to check the proportion of long-lived daughter products of radon and mineral dust in order to verify the proper working conditions of the ventilation system must be taken for all the principal technological phases of operation and at the mine's main air exits. The samples shall be taken at a height of 1.5-1.8 meters at least once every 3 months.

The measuring equipment must meet these conditions: it must pump at least 20 m^3 of air per hour and must satisfy the sensitivity standard of measuring 0.037 B_q/1 of air.

Article 43

Every mine must have logs on the results of measurements as follows:

1) a log of radon and its short-lived daughter products at work sites and for the principal technological phases of operation;

2) a log of radon and its short-lived daughter products of the mine's exhaust air streams and of the exhaust air streams of the excavation areas;

3) a log of the long-lived daughter products of radon and of radioactive dust;

4) a log of gamma radiation on the basis of personal dosimeters and on monitoring work sites with gamma counters;

5) a log on inspections and measurements of areas which have been insulated or isolated;

6) a log of sources of radon other than stopes and work sites;

7) a log on the radioactivity of mine water.

The equilibrium factor of radon and its daughter products (F) shall be entered in the log of radon and its short-lived daughter products at the work sites if the proper operation of the ventilation system is monitored by measuring the concentration of radon.

The results of measurements of radon and its short-lived daughter products at ventilation stations and the mine's main ventilation exits and the equilibrium factor of radon and its short-lived daughter products (F) shall also be entered in the mine's ventilation log.

Article 44

Every mine or portion of a mine must have a ventilation chart of the mine in which these data are entered: for work sites--the average of the measured concentrations of radon or its short-lived daughter products, and for ventilation stations--the average measured concentrations of radon or its short-lived daughter products and the equilibrium factor between radon and its short-lived daughter products (F), on which areas which have been isolated or insulated and sources of radon other than stopes and work sites shall also be sketched, and the concentrations or its short-lived daughter products shall be entered.

Article 45

Every mine must be furnished with a plan for the measurement of radon or its short-lived daughter products in case the ventilation ceases to operate.

III. Conditions and Requirements in the Processing of Nuclear Raw Materials

Work Procedures Related to Ventilation

Article 46

In areas where nuclear raw materials are processed the conditions envisaged for ventilation of enclosed spaces with fresh air in a combination of mechanical and natural ventilation or solely with mechanical ventilation must be met. Ventilation must be so designed that the contaminated air does not enter one work room from another work room, but must be expelled from every room.

Fresh air shall be introduced into those zones of an area where the radioactivity is lower and directed to the zones where it is higher.

Article 47

The entry points of air for ventilation must be far enough from the exit points of the air stream so as to prevent a mixing of the spent air with the fresh air. The points of entry or exit of the air shall be determined as a function of the position of the facility or rooms in the facility and also in

view of the air flow (wind direction) at the site where the facility is located.

Article 48

The air flows must be so directed as not to raise the dust from the floor or other surfaces.

Article 49

Areas in which dry uranium concentrate is being processed must have a separate ventilation system.

In areas where dry uranium concentrate is being processed exhaust ventilation must be induced.

Article 50

The system for ventilating auxiliary areas (dressing rooms, shower rooms, etc.) may not be the same as the system for ventilating work areas intended for the processing of nuclear raw materials.

Article 51

Ventilation ducts must be made of a material resistant to corrosion and installed so that their individual parts can be replaced easily and quickly.

Article 52

Vessels and reactors in which liquid radioactive material is kept or processed must be placed in protective tanks.

Article 53

Air contaminated with radioactive dust must be purified to the prescribed limits before being emitted into the atmosphere. As a rule "wet" methods (scrubbing) must be used to clean air contaminated with radioactive dust, and dry methods (cyclones, filter, etc.) are to be used only in exceptional cases.

Article 54

Steam, gases and dust must be cleaned from devices for drying concentrate in a separate system so that before cleaning they do not mix with the air from other ventilation systems.

Article 55

The equipment for procedures in which gaseous waste products are created and where the possibility exists of creation of aerosols must be so designed as to prevent the passage of the aerosol into the workplace air, and devices must be installed in the ventilation system to remove droplets.

Article 56

The surfaces of devices in which radioactive material is processed must be suitable for washing. The water used to rinse the surfaces of spray devices shall as a rule be used in the process itself, and if this is not possible, there must be a separate system for drainage and collection of the wastewater.

Article 57

Vessels containing the product (uranium or thorium concentrate) must be kept in special well-ventilated structures.

Article 58

Liquid waste must be collected in special tanks made of impervious material.

The concentration of radium and uranium in the liquid waste referred to in Paragraph 1 of this article must be monitored.

Article 59

Solid waste from a phase in processing nuclear raw materials must be deposited on special tailings piles intended solely for that purpose. Tailings piles for solid waste from the phase of processing must rest on an impervious layer of either natural or man-made material.

The surface of waste must be protected from erosion by wind or precipitation by being covered with a natural or man-made material.

The tailings pile must be set off by a fence and marked with the radioactivity symbol. Material which is dumped must be accompanied by a test report in which data are entered on the amount of material and the gamma radiation measured at a distance of 1 meter from the material.

Article 60

There must be no source of water in the terrain intended for a tailings pile. If this cannot be avoided, all springs must be capped, and the mixing of the water with the waste must be prevented.

Surface water must not be allowed to flow from the surrounding terrain to the tailings pile.

Article 61

The water draining off the tailings pile must be collected (in drains), monitored and treated as liquid waste.

Article 62

Piles of ore from which uranium is leached may only be placed in insulated tanks.

The floors and walls of the tanks must be made of impervious material and must be sufficiently strong as to not crack (or suffer damage) when loaded with the ore and when equipment is used.

It is prohibited to discharge liquid from the insulated tanks into the environment.

Article 63

Ore may also be leached in the mine. Areas for leaching ore in the mine must be made safe against collapse.

The floors of areas for leaching ore in the mine must be made of material which is impervious to water and must have a slope of at least 2 percent in the direction of collection ditches or drainage tunnels.

Areas for leaching the ore in the mine may not be in the mine's fresh air stream. The air stream which ventilates those areas must be directed by the shortest route to the mine's exhaust air stream.

Article 64

Devices and equipment in which liquids containing uranium are kept, transferred and processed must be so designed as to prevent the spillage of those liquids into the environment (protective tanks, floors of impermeable material, etc.).

Article 65

After leaching the spent ore must be neutralized and carefully placed on the tailings pile, which shall meet the conditions stated in Article 59 of this regulation.

Article 66

Provision must be made in the prospecting, mining and processing of nuclear raw materials for the measurement of radioactive contaminants and radioactive radiation in the workplace, and the intensity of radiation and contamination shall be monitored.

Article 67

The intensity of radiation shall be monitored with appropriate devices such as ionizing chambers and Geiger-Mueller counters or scintillation counters. Beta-gamma radiation shall be measured in order to ascertain the intensity of external radiation.

If film or thermoluminescent dosimeters are used in the measurement referred to in Paragraph 1 of this article, they must be adjusted as a function of the intensity of the radiation.

Article 68

Alpha and beta activity shall be monitored by measurement as follows:

i. contamination of work areas (tables and work equipment) shall be measured at work stations where samples shall be taken to measure contamination of the workplace atmosphere at equal intervals;

ii. contamination of the floor and walls which are frequently wetted with liquids containing contaminants shall be measured once every 3 months;

iii. contamination of the floor in passages (corridors) shall be measured once a month;

iv. contamination of surfaces in areas where work is done with uranium or thorium concentrate shall be measured on the floor and walls of the areas and on the surfaces of equipment at a height between 90 and 150 cm from the floor once a month;

v. contamination of the external surface of air ducts for dust removal by suction shall be measured once a month;

vi. contamination of the walls and floor of areas used for maintaining mining equipment, both at the surface and in the mine, shall be measured quarterly.

Article 69

Ventilation shall be monitored as follows:

i. by measuring the effectiveness of the suction devices once a week;

ii. by measuring the capacity of equipment for dust removal from ventilation air once a month (content of dust in the air ahead of and after the device).

Article 70

Alpha, beta and gamma radiation must be measured once a year in the areas around tanks, pipelines and devices which have inserts or which are charged (filters, columns charged with sand, charcoal, plastic material, etc.).

Article 71

Facilities used for processing nuclear raw materials must be cleaned with water or by other appropriate means before being shut down for an extended period ("mothballed"), and elimination of radioactive contamination must be proven by measuring the radioactivity.

Article 72

Equipment used in the preparation of nuclear raw materials or scheduled for disassembly must be washed with water and other appropriate agents, and it must be proven by measurement of the radioactivity that radioactive contamination has been eliminated to the limit required in the future use.

Article 73

This regulation shall take effect after expiration of 1 year from the date of publication in SLUZBENI LIST SFRJ.

7045
CSO: 5100/3004

INTERREPUBLIC AGREEMENT ON UNIFYING NUCLEAR PROGRAM

Belgrade SLUZBENI LIST SFRJ in Serbo-Croatian No 48, 20 Sep 85 pp 1397-1402

[Social compact among the Federal Executive Council, the executive councils of the republics and provinces, and economic organizations: "Social Compact on Uniform Procedure for Selection of a Single Nuclear Fuel Cycle and Type of Nuclear Power Plant"]

[Text] On the basis of Article 124 of the SFRY Constitution, the Federal Executive Council, the Executive Council of the Assembly of SR [Socialist Republic] Bosnia-Hercegovina, the Executive Council of the Assembly of SR Montenegro, the Executive Council of the Assembly of SR Croatia, the Executive Council of the Assembly of SR Macedonia, the Executive Council of the Assembly of SR Slovenia, the Executive Council of the Assembly of SR Serbia, the Executive Council of the Assembly of SAP [Socialist Autonomous Province] Kosovo, and the Executive Council of the Assembly of SAP Vojvodina, the SOUR [Complex Organization of Associated Labor] for the Production, Transmission and Distribution of Electric Power "Elektroprivrede Bosne i Hercegovine" (Bosnia-Hercegovina Electric Power Industry) of Sarajevo, the Work Organization for Production and Transmission of Electric Power and Construction of Electric Power Facilities of the Electric Power Industry of Montenegro of Niksic, the Community of Croatian Electric Power Organizations in Zagreb, the SOUR for the Production, Transmission and Distribution of Electric Power "Elektrostopanstvo na Makedonija" (Electric Power Industry of Macedonia) of Skopje, EGS--SOUR of the Electric Power Industry of Slovenia in Maribor, the SOUR "Zdruzena elektroprivreda" (Consolidated Electric Power Industry) in Belgrade, the SOUR "Elektroprivreda Kosova" (Electric Power Industry of Kosovo) in Pristina, "Elektrovojvodina"--SOUR for the Production, Transmission and Distribution of Electric Power and Thermal Energy, Engineering, Design and Construction of Electric Power Facilities in Novi Sad, the SIZ [Self-Managing Community of Interest] of the Electric Power Industry of SR Bosnia-Hercegovina, the Republic SIZ of the Electric Power Industry of SR Montenegro, the SIZ of Electric Power Consumers of SR Croatia, the SIZ for the Fuel and Power Industry of SR Macedonia, ISEP--Special SIZ for the Electric Power Industry and Coal Industry of SR Slovenia, the SIZ of the Electric Power Industry of SR Serbia, the Provincial SIZ of the Electric Power Industry of SAP Kosovo, the SIZ of the Electric Power Industry of Vojvodina, the Community of the Yugoslav Electric Power Industry, the Yugoslav Business Community of Machinebuilding and Power Machinebuilding--JUSEL, and the Business Community for Exploration and Research, Development and Peaceful Use of Nuclear Energy--NUKLIN, hereby conclude the following

SOCIAL COMPACT
on Uniform Procedure for Selection of a Single Nuclear Fuel Cycle
and Type of Nuclear Power Plant

Article 1

Proceeding on the basis of the common interest and goal in the policy for development and application of nuclear energy as set forth in the Agreement on the Bases of Yugoslavia's Long-Range Plan for Development and Application of Nuclear Power in the Fuel and Power Industry up to the Year 2000 (SLUZBENI LIST SFRJ, No 18, 1982), the parties to the present social compact (hereinafter "parties to the Compact") herein set forth the following:

1) the uniform procedure for gathering technical, technological, economic, financial and other data of general public interest and for establishing the conditions for selection of a single nuclear fuel cycle and type of nuclear power plant;

2) the procedure for drafting and approving proposals and elements for decisionmaking on selection of a single nuclear fuel cycle and decisionmaking on choice of the type of nuclear power plant.

Article 2

The parties to the Compact are agreed that they will take measures within the limits of their respective rights and duties to build nuclear power plants up to the year 2000 on the basis of the single nuclear fuel cycle and the specified type of nuclear power plant selected in accordance with the procedure set forth in this social compact.

The parties to the Compact are agreed that they will take steps within the limits of their respective rights and duties so that in the selection of a nuclear fuel cycle and type of nuclear power plant due consideration is given to the possibility of incorporating the new generation of nuclear power plants into the electric power system of the Socialist Federal Republic of Yugoslavia from the technical, technological, energy and socioeconomic standpoint on behalf of long-term supply of energy or long-term optimum production of electric power and guaranteeing nuclear safety.

Article 3

For the purpose of this social compact "type of nuclear power plant" means the technological type of nuclear power plant within the limits of the nuclear fuel cycle which has been selected, that is, a nuclear power plant with light-water reactor and water under pressure (PWR and VVER), or with boiling water (BWR), or with a heavy-water reactor (HWR).

Article 4

The parties to the Compact are agreed that construction of nuclear power plants in the Socialist Federal Republic of Yugoslavia should be based on a

series of nuclear power plants with reactors of the same type, which makes it possible for the Yugoslav industry to achieve independence in carrying out the Agreement on the Bases of Yugoslavia's Long-Range Plan for Development and Application of Nuclear Energy in theFuel and Power Industry up to the Year 2000, Article 7 of that agreement in particular.

The parties to the Compact shall take steps in order to set forth the criteria, regulations, standard specifications and standard types and models which will make it possible to modernize and build nuclear power plants and involve the domestic industry in building and taking over technology on the basis of the agreed division of labor.

The parties to the Compact are agreed that they will conclude basic contracts with the foreign trading partner for construction of the series of nuclear power plants in which all the technical and commercial terms and conditions are to be set forth for building and equipping the first nuclear power plant in the series, with the option for the subsequent power plants in the series in accordance with the criteria stated in Article 10 of this social compact.

The parties to the Compact are agreed that for the purpose of building each power plant in the series an invitation for bids will be advertised within the confines of the selected type of nuclear power plant so that the trading partner with which the basic agreement referred to in Paragraph 3 of this article was concluded would have preference assuming that other conditions are equal.

Article 5

The parties to the Compact are agreed that the choice of the single nuclear power cycle and the related choice of the type of nuclear power plant is to be made on the basis of bids obtained on the basis of a single and simultaneous advertisement of the documentation for the bid referred to in Article 7 of this social compact.

The advertisement or invitation for bids must contain all the necessary elements and data for selection of the single nuclear fuel cycle and type of nuclear power plant and for drafting proposals for decisionmaking concerning choice of the single nuclear fuel cycle and the decision on selection of a type of nuclear power plant.

Article 6

The parties to the Compact are agreed that within the limits of their respective rights and duties they will take steps so that the investors in the first nuclear power plant and investors in succeeding nuclear power plants in the series, within the framework of the Community of the Yugoslav Electric Power Industry (hereinafter "JUGEL"), together with the Yugoslav Business Community of Machinebuilding and Power Machinebuilding--JUSEL (hereinafter "JUSEL"), in collaboration with the Business Community for Research and Exploration, Development and Peaceful Use of Nuclear Energy--NUKLIN (hereinafter "NUKLIN") and other specialized organizations, shall prepare a single advertisement or invitation for gathering bids for the construction and equipment of nuclear power plants.

The advertisement or invitation for bids must contain the conditions and data necessary for appraisal of the bids (technical, technological, economic and financial) and other data necessary for the purchase of equipment and materials and performance of services, as well as conditions for transfer of technology, but in particular the following data:

1) on nuclear fuel;

2) on the nuclear fuel cycle;

3) on the nuclear system for generating steam;

4) on other systems of nuclear discharge;

5) on the turbogenerator plant;

6) on other equipment;

7) on conditions for transfer of technology and know-how;

8) on commercial and financial terms and conditions;

9) on the performance dates and schedules;

10) on guarantees;

11) on legal conditions.

Article 7

The parties to the Compact are agreed that the documentation for gathering bids shall consist of the following:

1) advertisements for gathering bids for selection of the technology for all phases of the nuclear fuel cycle, that is, for the production of heavy water, which includes the conditions for services, for delivery of equipment and for transfer of technology, as well as for long-term supply of the necessary raw materials or nuclear fuel to the Socialist Federal Republic of Yugoslavia, including a proposal of the elements for concluding the basic contracts;

2) advertisements for gathering bids as to the commercial, financial, technical and other terms and conditions for building a series of nuclear power plants in Yugoslavia, including the total capacity of the nuclear power plants in the series, their purpose and the construction schedule, for delivery of equipment of nuclear power plants and for transfer of technology for production of equipment for the purpose of industrial cooperation with Yugoslav partners and for establishing the pace and scope of the domestic industry's inclusion in the building and equipping of nuclear power plants, along with a proposal of the elements for concluding the basic contracts;

3) advertisements for gathering bids as to the commercial and technical conditions for building the "Prevlaka" Nuclear Power Plant--the first nuclear power plant in the series--along with detailed data necessary for concluding contracts.

Article 8

The parties to the Compact are agreed that the advertisement for gathering bids shall contain the following terms and conditions:

1) the development and enablement of Yugoslav organizations of associated labor in the fields of research, development, design, construction and electric power, and organizations of associated labor in those fields of industry concerned with the development and production of equipment for the nuclear power industry, in mastering the production of the nuclear fuel cycle and in construction and operation of nuclear power plants;

2) the share of the domestic industry and other domestic organizations of associated labor in building the series of nuclear power plants and in building the industrial plants for the nuclear fuel cycle in Yugoslavia and for it to gradually become independent;

3) the possibility of exporting nuclear power plants to third markets or for the export of equipment manufactured even according to foreign technology;

4) inclusion of domestic organizations of associated labor in the targeted research, development and transfer of new technologies in the field of nuclear power during the period of collaboration with foreign partners;

5) regular supply of nuclear raw materials, imported supplies, equipment and spare parts for nuclear power plants and plants in the nuclear fuel cycle and the furnishing of services within the domain of the nuclear fuel cycle.

Article 9

The parties to the Compact are agreed that in preparing the advertisement or invitation for bids for construction of nuclear power plants they may if necessary engage professional consultants from abroad.

Article 10

The parties to the Compact are agreed that in advertising for bids they will define terms and conditions that will guarantee and satisfy the following public interests as criteria for appraisal of the bids, specifically as follows:

1) safe and reliable operation of nuclear plants, the guaranteed safety of personnel, protection of the environment and the availability of the plants during their operating life;

2) technical safety and safe operation of nuclear power plants and industrial plants related to the nuclear fuel cycle in accordance with domestic regulations and international obligations which have been assumed;

3) the economic advantage of the type of nuclear power plant and fuel cycle offered from the standpoint of individual and total investments, production costs and expenditures of foreign exchange;

4) guarantee of long-term supply of nuclear raw materials in the various phases of production and processing of nuclear fuel and reliable supply of fuel elements;

5) the transfer of technology for the production and processing of nuclear fuel under favorable terms and conditions and at prices which afford the greatest possible independence of the country in mastering the nuclear fuel cycle;

6) the processing of spent nuclear fuel for the purpose of using residual uranium and the plutonium created for nuclear fuel in nuclear power plants;

7) the transfer of knowledge and know-how in the domain of design, engineering, construction and testing of systems, quality control and operation of nuclear power plants;

8) the transfer of technology for production of equipment and rendering of services for the domestic industry's optimum mastery of nuclear technology introduction;

9) gradually taking over management of the entire construction of nuclear power plants and the infrastructure of the fuel cycle;

10) the furnishing of organizations of associated labor corresponding compensation deals in equipment and services and other favorable commercial arrangements on the part of the foreign trading partner;

11) more favorable financial and credit conditions--lower costs for the transfer of technology, delivery of equipment and performance of services;

12) long-term enablement of domestic scientists and specialists in the research, development and application of nuclear power in the fuel and power industry through the targeted research and formal training and specialization of personnel;

13) consumption of nuclear fuel in operation of power plants;

14) the broader socioeconomic interests of the collaboration offered (technological, economic and foreign trade benefits, the possibility of sales on third markets, and so on);

15) the experience and proven ability of the foreign trading partners in building and equipping nuclear power plants, especially in the developing countries;

16) the possibility of using the technology of the reactor and fuel system offered in improved and new types of reactors and different types of fuel.

Article 11

The parties to the Compact are agreed that the investors in nuclear power plants included in the series which are to be built by the year 2000 in the Socialist Federal Republic of Yugoslavia, that is, the investors in the nuclear power plant "Prevlaka," within the framework of JUGEL, together with JUSEL, in collaboration with NUKLIN and other specialized organizations, are to gather and systematize the documentation for the bids and for preparation of the advertisements.

Self-managing communities of interest in the field of fuel and power or the electric power industry, and also organizations of associated labor in the electric power industry in the republics and autonomous provinces, as parties to this social compact, are agreed that within a period of 3 months from the date when this social compact takes effect, they will conclude a self-management accord within the framework of JUGEL on joint financing and performance of preparatory work to define the conditions in the advertisement for gathering bids for construction of nuclear power plants in the series.

The parties to the Compact are agreed that the self-management accord referred to in Paragraph 2 of this article should specifically regulate the total capacity, purpose, pace of construction and conditions for determination of the location of the nuclear power plants in the series.

Article 12

The investors in the nuclear power plants, within the framework of JUGEL, JUSEL and NUKLIN, as parties to this social compact, hereby assume the obligation that within 3 months from the date when this social compact takes effect they will set forth the mutual rights and obligations in making preparations and advertising for the gathering of bids and also concerning participation in the costs of preparing and conducting the invitation for bids.

Article 13

The parties to the Compact are agreed that within the limits of their respective rights and duties they will take steps so that the portion of documentation for the bid referred to in Article 7, Subparagraphs 1 and 2, of this social compact shall be advertised by investors in nuclear power plants in the series in conformity with the self-management accord referred to in Article 11 of this social compact and the rights and obligations set forth in accordance with Article 12 of this social compact, and that the portion of documentation for the bid referred to in Article 7, Subparagraph 3, of this social compact shall be advertised by the investor in the nuclear power plant "Prevlaka."

The parties to the Compact are agreed that by taking steps and action within their competence they shall guarantee that the advertisements for bids referred to in Article 7 of this social compact shall be published simultaneously.

Article 14

The investors in nuclear power plants referred to in Article 11 of this social compact within the framework of JUGEL hereby assume the obligation that together with JUSEL, in collaboration with NUKLIN and other specialized organizations in the domain of design, they will work out a uniform methodology for processing and appraising the bids on the basis of the criteria contained in this social compact, simultaneously with preparation of the advertisement for gathering bids.

Article 15

The parties to the Compact are agreed that within the limits of their respective rights and duties they will take measures so that the bids received concerning advertisements for bids referred to in Article 7, Subparagraphs 1 and 2, of this social compact are appraised by investors in building the nuclear power plants in the series.

The bids referred to in Paragraph 1 of this article shall be jointly appraised by the investors in the nuclear power plants referred to in Article 11 of this social compact within JUGEL, in collaboration with the organizations of associated labor in the field of machinebuilding and power machinebuilding associated with one another in JUSEL, also engaging organizations of associated labor in project design and scientific fields.

The bids for construction of the nuclear power plant "Prevlaka" are to be appraised by investors in that nuclear power plant in accordance with the results of the appraisal done according to Paragraph 1 of this article.

The parties to the Compact are agreed that professional consultants from abroad may be engaged to appraise the bids if necessary.

Article 16

The parties to the Compact are agreed that on the basis of the appraisal contained in Article 15 of this social compact the investors in the nuclear power plants referred to in Article 11 of this social compact within the framework of JUGEL, together with JUSEL and NUKLIN, will submit to the Federal Executive Council the proposals of a decision on the choice of a single nuclear fuel cycle and a decision on choice of a type of nuclear power plant.

Article 17

The parties to the Compact are agreed that the proposal of the decision on choice of a single nuclear fuel cycle and the proposal of a decision on selection of a type of nuclear power plant should contain the following elements:

1) the principles and criteria on which selection of the uniform nuclear fuel cycle and type of nuclear power plant is to be based;

2) the grounds or substantiation of the selection proposed;

3) the possibility for the domestic industry and other domestic potential to become optimally involved in building and equipping nuclear power plants;

4) the procedure and basic conditions for achieving the proposed single nuclear fuel cycle and type of nuclear power plant;

5) a proposal of trading partners with which negotiations should continue concerning collaboration in carrying out the program for development and construction of nuclear facilities in the country;

6) the grounds for rejecting other bids or alternative solutions.

Article 18

The Federal Executive Council, as a party to the Compact, agrees to set forth the procedure and manner of publishing the decision on selection of the single nuclear fuel cycle and decision on selection of the type of nuclear power plant.

Article 19

The parties to the Compact are agreed that within the limits of their respective rights and powers, once the decision has been made on selection of the single nuclear fuel cycle and the decision made on selection of the type of nuclear power plant, they will conclude the following:

1) intergovernmental arrangements;

2) the basic contracts in the field of the single nuclear fuel cycle;

3) the basic contracts in the field of carrying out the program for the series of nuclear power plants, the transfer of technology and development, in conformity with the provisions of this social compact.

The parties to the Compact are agreed that the basic contract shall be the basis for letting commercial contracts for construction of nuclear power plants in the series and for the plants in the nuclear fuel cycle, the point of departure being the principle that the trading partner selected must always be fully competitive, which is to be proven on the basis of the bids gathered and their appraisal.

The parties to the Compact are agreed that the basic contracts may also be concluded with more than one trading partner if multiple collaboration on the single nuclear fuel cycle that has been selected and the type of nuclear power plant speeds up the country's achievement of independence and affords more favorable terms and conditions for carrying out the program for construction of nuclear plants, which is to be evaluated on the basis of the conditions and criteria set forth in Articles 8 and 10 of this social compact. The decision on concluding those contracts shall be made by the Federal Executive Council.

The parties to the Compact are agreed that the investor shall conclude the commercial contracts and financial arrangements for building the nuclear power plant "Prevlaka," in conformity with the provisions of this social compact and the basic contracts referred to in Paragraph 1, Subparagraph 3, of this article.

Article 20

The parties to the Compact are agreed that activities related to making the decision on choice of the single nuclear fuel cycle and the decision on selection of the type of nuclear power plant shall be conducted before the following target dates:

1) preparation of documentation for the gathering of bids--by 31 July 1985,

2) publication of advertisements or sending out of invitations for gathering the bids--by 31 August 1985,

3) gathering of bids--by 28 February 1986,

4) appraisal of the bids received--by 31 August 1986,

5) preparation of the proposal of the decision on selection of the single nuclear fuel cycle and proposal of the decision on selection of the type of nuclear power plant--by 30 September 1986,

6) taking of the decision on selection of the single nuclear fuel cycle and decision on selection of the type of nuclear power plant--by 31 December 1986.

Article 21

The parties to the Compact shall by their measures and actions exert influence so that organizations of associated labor (in the production of equipment, installation, design, research, etc.) interested in carrying out the nuclear power program up to the year 2000 organize themselves and agree on the mutual division of labor and specialization and to that end, before completion of drafting of the documentation for the bids, conclude appropriate agreements on their own mutual association and organization.

Article 22

The Committee for Monitoring and Implementing the Social Compact on Uniform Procedure for Selection of the Single Nuclear Fuel Cycle and Type of Nuclear Power Plant (hereinafter the "Committee") shall be established by the parties to the Compact in order to monitor performance of this social compact.

One representative of every party to the Compact shall be a member of the Committee. Every member of the Committee shall have his deputy.

The parties to the Compact are agreed that the Committee shall inform the parties to the Compact on its implementation, shall issue instructions for

application of the provisions of this social compact and shall extend aid to self-managing organizations and communities, shall initiate and coordinate conclusion of self-management accords and the adoption of general acts, shall evaluate the suitability of the content of the advertisement or invitation for bids in conformity with the criteria contained in this social compact, shall verify the uniform methodology referred to in Article 14 of this social compact, shall inform the parties to the Compact within 30 days concerning participants who have subsequently joined in this social compact, and shall perform other functions as set forth in this social compact.

Article 23

The Committee for monitoring and implementing this social compact shall adopt its own operating procedure.

The matters taken up by the Committee shall be decided on in the manner set forth in the Committee's operating procedure.

Article 24

The federal administrative agency competent for energy and industry shall perform administrative and technical functions related to implementing this social compact.

Article 25

This social compact shall be considered concluded when it has been accepted and signed by the authorized representatives of all the parties to the Compact.

Article 26

This social compact shall be amended and supplemented in the manner and according to the procedure envisaged for its conclusion.

Article 27

This social compact shall take effect on the 8th day after publication in SLUZBENI LIST SFRJ.

On behalf of the Federal Executive Council
Rade Pavlovic (signed), member of the Council and chairman of the Federal Committee for Energy and Industry

On behalf of the Executive Council of the Assembly of SR Bosnia-Hercegovina
Dr Muris Osmanagic (signed), adviser in the Council

On behalf of the Executive Council of the Assembly of SR Montenegro
Rajko Vukcevic (signed), member of the Council

On behalf of the Executive Council of the Assembly of SR Croatia
Vjekoslav Srb (signed), member of the Council

On behalf of the Executive Council of the Assembly of SR Macedonia
Dr Aleksandar Manevski (signed), member of the Council

On behalf of the Executive Council of the Assembly of SR Slovenia
Dr Milan Copic (signed), adviser in the Council

On behalf of the Executive Council of the Assembly of SR Serbia
Dr Dusan Jovanovic (signed), member of the Council

On behalf of the Executive Council of the Assembly of SAP Kosovo
Aziz Abrashi (signed), member of the Council

On behalf of the Executive Council of the Assembly of SAP Vojvodina
Vasilije Piroski (signed), member of the Council

On behalf of the SOUR for Production, Transmission and Distribution of Electric Power "Elektroprivrede Bosne i Hercegovine" of Sarajevo
Urfet Vejzagic (signed), member of the Business Board

On behalf of the Work Organization for the Production and Transmission of Electric Power and Construction of Electric Power Facilities "Elektroprivrede Crne Gore" of Niksic
Mirko Bajagic (signed), adviser

On behalf of the Community of Electric Power Organizations of Croatia in Zagreb
Voislav Roksandic (signed), chairman of the Business Board

On behalf of the SOUR for Production, Transmission and Distribution of Electric Power "Elektrostopanstvo na Makedonija" in Skopje
Kosta Georgiev, MA (signed), acting chairman of the Business Board

On behalf of EGS--Complex Organization of the Slovenian Electric Power Industry in Maribor
Ivan Lesnik (signed), acting director of the Development Sector

On behalf of the SOUR "Zdruzena elektroprivreda" in Belgrade
Mileta Jesic (signed), general director

On behalf of the SOUR "Elektroprivreda Kosova" in Pristina
Bozidar Saarnovic (signed), vice chairman of the Business Board

On behalf of "Elektrovojvodina"--SOUR for the Production, Transmission and Distribution of Electric Power and thermal Energy, Engineering, Design and Construction of Electric Power Facilities in Novi Sad
Vilmos Molnar (signed), chairman of the Business Board

On behalf of the SIZ of the Electric Power Industry of SR Bosnia-Hercegovina
Nasko Volic (signed), SIZ president

On behalf of the Republic SIZ of the Electric Power Industry of SR Montenegro
Veselin Sljivancanin (signed), SIZ secretary

On behalf of the SIZ of Electric Power Consumers of SR Croatia
Gliso Jelic (signed), SIZ secretary

On behalf of the SIZ for the Fuel and Power Industry of SR Macedonia
Bozidar Magdeski (signed), SIZ secretary

On behalf of ISEP--Special SIZ for the Electric Power Industry and Coal Industry of SR Slovenia
Drago Stefe, MA (signed), president of the Assembly

On behalf of the SIZ of the Electric Power Industry of SR Serbia
Milutin Vucic (signed), SIZ secretary

On behalf of the Provincial SIZ of the Electric Power Industry of SAP Kosovo
Idriz Ibrahimi (signed), SIZ secretary

On behalf of the SIZ of the Electric Power Industry of Vojvodina
Djordje Ristic (signed), SIZ secretary

On behalf of the Community of the Yugoslav Electric Power Industry
Koco Bojadzijev (signed), assistant general director

On behalf of the Yugoslav Business Community of Machinebuilding and Power Machinebuilding--JUSEL
Slavko Jovic (signed), chairman of the Council

On behalf of the Business Community for Research and Exploration, Development and Peaceful Use of Nuclear Power--NUKLIN
Predrag Anastasijevic (signed), director

7045
CSO: 5100/3003

YUGOSLAVIA

BRIEFS

PUMPS FOR USSR NUCLEAR GENERATORS—The MIN [Machine Industry, Nis] enterprise in Nis will deliver to a partner in the USSR six special emergency pumps for use in nuclear generating units. According to the contract concluded with "Atomenergoeksport" in Moscow, this export of equipment is valued at $1.6 million and will be carried out by the end of 1986. The "Jastrebac" Pump Factory is responsible for this production of pumping equipment for nuclear units, and will also deliver seven such pumps to a partner in Bulgaria. [Text] [Belgrade EKONOMSKA POLITIKA in Serbo-Croatian 2 Sep 85 p 31]

YUGOSLAV PUMPS TO HUNGARY—At the Zagreb Fall Fair the "Jugoturbina" enterprise in Karlovac, Croatia, emphasized its equipment for nuclear power plants, especially the "PE" and "SPE" pumps and a number of other new products being produced in the work organizations of this large enterprise, which was reported to have concluded one of the largest export contracts with Hungary for nuclear generator pumps. [Excerpt] [Belgrade PRIVREDNI PREGLED in Serbo-Croatian 20 Sep 85 p 12]

CSO: 5100/3005

BRIEFS

CPPS DELEGATES MEET--The General Secretariat of the Permanent South Pacific Commission [CPPS] will continue its protests against nuclear explosions in the Pacific Ocean. This was agreed at the 18th regular meeting of this organization held in Santa Cruz, Galapagos Islands. A draft agreement for the conservation, protection, and optimum utilization of the tuna species in the Pacific was analyzed at the conclave and it was recommended that the South Pacific governments should coordinate their actions in order to conclude the negotiations. The delegates from Colombia, Ecuador, Peru, and Chile present at the meeting agreed to support the research work on the subject of radioactive contamination in the area. The four countries also agreed to harmonize their laws in order to take full advantage of the results of foreign scientific research in their waters. [Text] [Quito Voz de los Andes in Spanish 1130 GMT 23 Sep 85]

CSO: 5100/2005

BRAZIL

CNEN PRESIDENT DISCUSSES NUCLEAR PROGRAM

PY152135 Rio de Janeiro O GLOBO in Portuguese 14 Oct 85 p 19

[Article by Ramona Ordonez]

[Text] The shipment of a few kilograms of beryllium oxide, discreetly exported to the United States 40 days ago as part of the new operation in the sophisticated field of nuclear technology, definitely marks the strengthening of the Brazilian nuclear program. This program, which is truly national and not very well known, is being implemented along with the nuclear program that foresees the transfer of technology from the FRG.

Besides the sophisticated electronic equipment used in nuclear medicine, sophisticated systems for industrial control, and research to gain insights into the technological packages of nuclear power sta ions, Brazil is making a breakthrough on its own concerning discovery of the basic principles of uranium enrichment, principles that will guarantee Brazilian independence in the nuclear field, whether they are applied in energy production, health, industry, or agriculture.

The single shipment of beryllium oxide represents the end of the primary phase (we used to export the unprocessed mineral at $100 per ton). Pure beryllium oxide, which lacks that type of essential bonding material used in all electronic control systems, brings prices of up to $350 per kilogram on the international market.

National Commission for Nuclear Energy (CNEN) President Rex Nazare Alves, who this week returned from the 29th annual meeting of the International Atomic Energy Agency in Vienna, is using this example to demonstrate the important breakthrough achieved over the past 3 years by the Brazilian nuclear program, which was implemented by the CNEN in close cooperation with research institutes and universities. The program's slogan is "autonomous national technology." According to Nazare Alves, all electronic equipment for radiation control, nuclear medicine, and industrial measurement gauges is completely nationalized now. He added: "A change of attitude, emphasizing increasing nationalization, is important."

Another important breakthrough has been achieved in the field of radioisotopes, 70 percent of which are being used in medicine, in the diagnosis and location of tumors, and in therapy. CNEN possesses the technology to produce and prepare radioisotopes at its institutes, namely the IPEN [Institute for Nuclear and Energy Research] in Sao Paulo and the IEN [Nuclear Energy Institute] in Rio de Janeiro.

In turn, the well-known Brazilian nuclear program, initiated 10 years ago as a large-policy and making the country a great nuclear power, is without funds, facing a crisis, and virtually paralyzed. The program is based on a cooperation agreement signed in 1975 with the FRG, an agreement providing for the transfer of technology for the construction of eight nuclear-power plants and transfer of the entire cycle for producing nuclear fuel by the year 2000.

After $4 billion has been spent without having produced a single kilowatt, the first power station -- Angra II -- is being built. No decisions have been made yet concerning Angra III and the other power stations that are planned. The program is being reassessed by a committee of the Mines and Energy Ministry formed by government representatives and scientists. The committee will determine the timetable of the projects seeking to preserve knowledge already gained.

Rex Nazare Alves said that in order to use any energy source, it is essential to have the raw materials and the required technology. Brazil possesses the fifth largest uranium reserves in the world (over 200,000 tons) and must obtain the technology required to use nuclear energy in the near future -- not just to produce electric power but also for use in the health, industry, and agriculture fields.

The CNEN president admits that it is necessary to adjust the Brazilian nuclear program, which is being implemented by Nuclebras along with the Germans, adapting it to the country's financial resources. According to Rex Nazare Alves, the Brazilian nuclear program needs a timetable, which would allow Brazil to gain the know-how to use nuclear energy in the future. "As the economy grows, requirements will increase along with nuclear energy. Nuclear energy will be increasingly used," Nazare Alves said.

When nuclear energy is discussed, nuclear power plants come to mind but nuclear energy is increasingly being used in other fields in the country. In Brazil, there are 2,325 institutions using nuclear energy in medicine, industry, research and commerce in all states except in Acre and Roraima.

Nuclear energy will play an important agricultural role in the preservation of food and cereals for several years without any alteration whatsoever in their quality. According to the CNEN president, within 2 years nuclear energy will be used in Brazil to preserve tropical fruit. CNEN is also conducting research at the Center for Using Nuclear Energy in Agriculture (CENA) to produce new wheat, pineapple, and corn varieties with greater yields. Irradiated vaccines are already being manufactured for animals. These vaccines eliminate the (dictyocaulus) bacillus, which reduces the life span of the cattle, from the cattle's lungs.

According to Nazare Alves, several countries, including the Netherlands, France, Israel, Japan and the United States, already have laws allowing the irradiation of food to preserve it without hurting the health whatsoever. Brazilian agriculture will be the great beneficiary of grain preservation in the future, Rex Nazare Alves asserted.

The independent nuclear program being developed by the CNEN and the research institutes since 1982 is conducting expanded research in over 25 items within the different energy fields. In addition, all the uranium enrichment processes (jet nozzle and gaseous diffusion) developed by the industrialized countries, like the United States and the FRG, are being studied and held under lock and key. Rex Nazare Alves is optimistic that some day he will be able to announce at the CNEN front door -- indeed, with plenty of press coverage -- that Brazilian scientists have learned the complex secret of the technology of uranium enrichment, known only to a few, guaranteeing Brazilian independence in the field of nuclear energy.

CSO: 5100/2007

U.S. AMBASSADOR LINKS COOPERATION TO FULL SAFEGUARDS

Karachi DAWN in English 29 Sep 85 p 8

[Excerpt] Lahore, Sept 28--The United States is prepared to cooperate with Pakistan in the nuclear field, provided it accepts international full-scope safeguards.

This statement was made by the US Ambassador in Pakistan, Mr Deane R. Hinton, while replying to an address of welcome presented to him at the Executive Committee meeting of the Lahore Chamber of Commerce and Industry here on Saturday.

Ambassador Hinton said: "If you provide full scope safeguards, all the nuclear powers will be pushing each other to get the business (of the nuclear energy programme in Pakistan)."

The safeguards, he argued, were not only sought by the United States, but also by 120 other countries. Enriched plutonium could be utilised both for power generation as well as for the manufacture of atomic weapons and there must be some mechanism to ensure that Pakistan's nuclear programme was for peaceful purposes only.

"You are misinformed. (Pakistan Government) accepts safeguards for the Karachi Nuclear Power project and the Pakistan Institute of Nuclear Science and Technology but for no other installation," the U.S. envoy replied when an LCCI member said that Pakistan had never refused to accept safeguards.

When another member pointed out that the U.S. was cooperating with India in the nuclear field without the latter's accepting the safeguards, Mr Hinton said: "We are not pushing you. The decision is up to you. The same thing holds true for India. We do not cooperate with India, nor with Israel in this field."

CSO: 5100/4703

PAKISTAN

COMMENTARY VIEWS U.S. AMBASSADOR'S REMARKS

GF081350 Lahore NAWA-E WAQT in Urdu 30 Sep 85 p 10

[Editorial: "Pakistan's Nuclear Program—The U.S.' Unfriendly Attitude"]

[Excerpts] Mr Deane R Hinton, U.S. ambassador in Pakistan, stated that if Pakistan agrees to international supervision of its nuclear installations, his country will not only cooperate with its nuclear program, but other advanced countries such as Belgium, France, and Japan will be vying for involvement, as well. He stated this at the Lahore Chamber of Commerce and Industry in reply to a question on the reason for the pressure being exerted on Pakistan by the United States, when the latter gives full support to Israel and India, which refuse to permit international supervision.

Even though the U.S. envoy is trying to give the impression that the United States is not cooperating with Israel and India in any nuclear field, to believe this we would have to consider other connotations of the term "cooperation," because the U.S. cooperation with India and Israel is not hidden. Whatever Israel is, is due to massive and constant U.S. assistance. Even U.S. circles admit that Israel has built a nuclear bomb, and in October 1973, when it feared a defeat at the hands of Egypt and Syria, it had planned to use it as a last resort. However, due to massive U.S. military aid, the need did not arise, and the tide of the war changed.

The U.S.-Israeli relationship does not need any explanation and the U.S. envoy's position is understandable, but what Mr Hinton has said about India is not true. India exploded a nuclear device in May 1974. Preceding this, the Indian Foreign Minister Mr Khurshid Alam Khan had warned Pakistan, in a speech in Parliament, that Pakistan should not labor under a delusion that it is in any way close to India with regard to its nuclear program, much less better. According to some unconfirmed sources, India had already manufactured a nuclear bomb and was behaving in a militant manner for this reason.

The United States had initiated intensive and open opposition to Pakistan's nuclear program in 1976, and had halted the delivery from France to Pakistan of the nuclear reprocessing supplies which had been ordered for the nuclear power plant at Chashma after Pakistan had accepted all international guarantees. Meanwhile, the United States continued its nuclear collaboration with India until 1982-83 and provided it with technical knowhow and equipment as well as enriched nuclear fuel.

Due to the situation created by the Soviet occupation of Afghanistan, the United States signed a long-term aid program to provide arms and economic assistance to the tune of $3.2 billion. This caused an expected uproar in India and a furor in the United States, thus a clause was inserted in the agreement stating that the latter would cancel all aid if a recipient country manufactured nuclear weapons.

When it was not possible for the United States to continue its collaboration with India due to this clause, Mr Reagan personally arranged the supply of enriched fuel to India by France when the late Mrs Gandhi visited the United States. This alternate arrangement continues even today. Later, U.S. Secretary of State Mr George Shultz assured India that provision of whatever nuclear equipment that could not be supplied by the United States would be arranged from Italy or the FRG.

This detailed report proves that restrictions imposed by the United States and countries under its influence are meant for Pakistan and Pakistan alone. The Pakistani people are justified in thinking that the vehement opposition of the Western countries and the intense pressure on Pakistan is an attempt to prevent the transfer of technology to the Islamic world via Pakistan. This is not a mere supposition, because Pakistan is alleged to be making an 'Islamic' bomb, while there has never been any reference to an American, Christian, Communist, Soviet, Israeli, or Hindu bomb.

The United States is a free and strong superpower and is able to adopt whatever policy it thinks fit for its own or world interests. It has the right to forge or strengthen relations with India or Israel. However, when it starts harping on so-called principles and clauses and professes to have adopted the policy approved by 120 other countries, Pakistan also has the right to complain or protest against the unjust and biased U.S. attitude.

The aid and cooperation given to Pakistan by the United States following the Soviet military usurpation of Afghanistan is appreciated and acknowledged by Pakistan, even though it is part of the United States' strategy to safeguard its international interests. The sole victim of its contradictory policy concerning a nuclear program, however, is Pakistan.

CSO: 5100/4704

AMERICAN, INDIAN ATTITUDE TOWARD PAKISTAN'S PROGRAM CRITICIZED

Karachi DAWN in English 19 Sep 85 p 7

[Text] It does not take a nuclear chauvinist to detect the aura of selectivity and hypocrisy which surrounds the American and Indian attitudes towards Pakistan's peaceful nuclear programme. No one can tell for certain what brief Under-Secretary Armacost or Special Assistant Fortier are carrying with them, but if it has anything to do with this particular subject, then it is only fair to hope that their time was more usefully spent in New Delhi which is after all, where the genie came out of the nuclear bottle in this part of the world. For reasons that perhaps go back to the crusades, Pakistan is regularly made to take the rap for something it neither possesses nor is desirous of possessing. Behind this curious anomaly lies the sustained Indian propaganda campaign which accuses Pakistan of being engaged in the secret manufacture of nuclear weapons. The United States also tends to take a similar view. The smear campaign in the Western media plus behind-the-scenes pressure tactics are twin indications of the American attitude. The two countries are thus linked by a common bond at least as far as this matter is concerned.

But it needs to be realised that the alarms about non-proliferation are being sounded in a framework which leaves little room for genuine understanding. It should be self-evident that the charges and counter-charges made in this connection can only be put to the test if the respective nuclear programmes of both India and Pakistan are put under full-scope international safeguards, and if both countries drop their reservations about the 1963 Non-Proliferation Treaty (NPT). But this precisely is where the problem lies. Pakistan has said time and again that it is ready to open its facilities to international inspection if India does the same. But India, for reasons best known to it, has consistently refused, leaving Pakistan with little choice except to follow suit. Its opposition to declaring South Asia a nuclear free zone, a proposal repeatedly advanced by Pakistan, is also a telling admission, about the double standard guiding its policy. India's intentions are thus pretty clear. It wants no other state in South Asia to encroach upon or contest its nuclear monopoly, much in the fashion of Israel which has a similar stake in keeping the Arabs primitive in the nuclear field. The key to non-proliferation in the region lies therefore in New Delhi which is where American efforts should be chiefly concentrated.

But the United States is at fault in another respect as well. Its efforts would command greater respect if it had been able to demonstrate more success than it has been able to in scaling down the global nuclear race. Given current nuclear levels, and the additions being contemplated to them, the US or any other nuclear power for that matter, is hardly in a morally sound position to lecture smaller nations about the evils of proliferation. The NPT while calling upon non-nuclear States not to make nuclear weapons also required the nuclear Powers to make strenuous efforts in the direction of general and complete disarmament, a goal they have dismally failed to reach. So it does not help to take an overly simplistic, or an overly selective, view of a subject which has its fair share of complexities. If the US is concerned about nuclear proliferation it must set the pace first and then go about anything else. In any event, arm-twisting suspects or finding scapegoats in a hurry are poor substitutes for an equitable and judicious policy.

CSO: 5100/4702

PAKISTAN

MINISTER TALKS ABOUT INDIA'S ALLEGED ATTACK PLANS

BK161624 Karachi Domestic Service in Urdu 1500 GMT 16 Oct 85

[Excerpt] Minister of State for Foreign Affairs Zain Noorani reaffirmed at the National Assembly this afternoon that Pakistan desires peace, friendship, mutual coexistence, and cooperation with India on the basis of respect for each other for the benefit of the people of both the countries. He was speaking on 14 identical adjournment motions seeking a debate on the press reports on India's alleged preparations for attacking [Pakistan's] nuclear installations at Kahuta. He said that Pakistan has carefully taken notice of the reports that India is making preparations to use its air force planes after putting Afghan markings on them to attack Pakistan's nuclear installations. Zain Noorani said that recently the Indian prime minister made false, baseless, fabricated and exaggerated allegations about Pakistan's nuclear program. He said that the Indian prime minister, while raising a hue and cry for such apprehension, tried to incite the foreign powers as well against Pakistan, saying that it may be possible that Pakistan will give the atom bomb to other countries also. He said that the Indian press also joined in fanning the propaganda. He said that Pakistan is confident that Indian public opinion is not that simple and silly that it can be misguided by such false and fabricated propaganda.

The state minsiter said that Pakistan does not merely recognize the need to stabilize mutual confidence, but it has taken several concrete steps in this regard. On nuclear issue also, Pakistan made special proposals for making South Asia a nuclear-free zone. He said that Pakistan is ready to accept international responsibilities and agreements to implement its proposals which include the declaration for renouncing nuclear weapons. He clarified that it is India which is not ready to accept any restriction about nuclear weapons. He said that it is India which possesses and amount of plutonium enough for producing more than [words indistinct] atom bomb, and it has already carried out nuclear explosion. The federal minister said that if any kind of aggression is launched against Pakistan, it will defend itself. He said Pakistan has also the means to trace the aggressor. He said that we will take every possible step to afflict a heavy blow on any one launching aggression against Pakistan.

CSO: 5100/4706

PAKISTAN

THE NUCLEAR DILEMMA: PAKISTAN'S OPTIONS EXAMINED

Karachi DAWN in English 19, 20 Sep 85

[Two-part article by M.B. Naqvi titled: "Advice on Nuclear Issue"]

[19 Sep 85 p 7]

[Text] Islambad is receiving bucketful of advice on the nuclear question. What is strange is the correspondence of views between the Indian and Pakistani hardliners; both are recommending to Pakistan to go nuclear.

At a recent gathering of Lahore's prominent ex-soldiers, politicians and intellectuals--Lt-Gen (retd) K.M. Azhar, Maj-Gen (retd) Sarfaraz Khan, Mr S.M. Zafar, Mian Khurshid Mahmood Kasuri, Dr Pervaiz Hasan, Dr Hasan Askari, Dr Shafique Chaudhri, Maj-Gen M.H. Ansari etc--the majority view was that Pakistan should boldly join the Nuclear Club. At the other end of the spectrum, Mr K. Subrahmanyam, Director of India's Defence Studies Institute and an influential hardliner, has in an article given reasons why Pakistan's possession of nuclear weapons would enable it to promote its security and get the leadership of Islamic bloc of nations.

Confusion over the nuclear subject abounds in the country. The nation has not debated it. True, there are many countries where no open national debate was organised and their Governments themselves decided the issue one way or another. But most of these countries are either those where a consensus over foreign policy goals exists--and thus a majority endorsement of the decision by a representative government could be assumed--or where outright dictatorships render people's involvement in such a decision, like all others, unnecessary.

Free Debate

Pakistan's position is peculiar. It is neither a functioning democracy where foreign policy aims can be said to enjoy popular approval nor are its people willing to settle down as totally helpless subjects under authoritarian rule. Here, an open and full debate on such a momentous subject is an urgent need. More so, there is no consensus at all on foreign policy orientation. Maybe a free debate will produce one.

Islamabad has a nuclear research programme that has made some progress. According to Dr A.Q. Khan, Pakistan has achieved one notable success: It has, by its own unaided efforts, acquired a nuclear enrichment capability. (And, in this field, it is supposed to be years ahead of India--a claim that the latter denies and, in turn, brags about undoubted Indian accomplishments). As it happens, this technology also has military uses. Therefore, there has been a loud chorus of disapproval from both the West and the East. Latterly the Indian Government has seized upon it in a determined manner and, during the last nine months, it has mounted a propaganda campaign of rare intensify that either Pakistan has made the Bomb or is on the verge of making it. Islamabad strenuously denies this and claims its programme to be wholly peaceful in intent.

Pakistani denials are not accepted, of course. Islamabad has therefore made a number of suggestions: let India and Pakistan both foreswear nuclear weapons and sign the Nuclear Non-Proliferation Treaty (NPT); South Asia as a whole should become a Nuclear Weapons-Free Zone (NWFZ); India and Pakistan can agree on a system of mutual inspection of each other's nuclear-capable installations; and a no-war pact should be signed between the two countries. Indian reaction has been extraordinarily cool. Mr K. Subrahmanyam himself has called the Pakistani proposals a public relations ploy.

This needs a looking into. A number of laboured arguments against a NWFZ in South Asia have been advanced. Their main burden is the possible doubt that neither India nor Pakistan can be sure about the other not having secretly kept a few nuclear bombs somewhere. This suspicion is enough, according to Subrahmanyam, to kill the proposal of NWFZ idea. The no-war pact idea is being ignored, though not rejected; it is countered with a comprehensive friendship and cooperation treaty that does not seem to interest Islamabad.

The proposal of both India and Pakistan coming under the umbrella of the NPT elicits contempt. It is dismissed on the ostensibly high moral ground of not according recognition to the nuclear haves' right to a monopoly of these dreaded weapons. India will not sign until the US, USSR, Britain, France and China credibly renounce their right to own and actually destroy their existing nuclear stockpiles. All nations have to be equal. How can these and other nuclear haves dare ask the others to renounce their options!

Subrahmanyam is a notable crusader for this international equality and reserves his sharpest barb for those anti-nuclear campaigners who are from the Third World. He has called the likes of this writer Uncle Toms. This hurts. One strongly denounces the nuclear haves' vertical proliferation and the global power politics and wishes the rest of the world to contain the contagion by refusing to copy them while pressing constantly for their disarmament, nuclear as well as conventional. But that is a different story.

What has upset most of the Indian hardliners is the Pakistan proposal of mutual inspections. Here again, laboured arguments are employed. Subrahmanyam is particularly elaborate. He finds any number of reasons for its impracticality. One of them is that Pakistanis would not know what to look for in a number of Indian facilities; Pakistani scientists and engineers can have no conception of what their Indian counterparts are doing in a number of fields. But his clincher is true and credible, if not necessarily valid: It will be an unequal bargain. Pakistan has at most two small facilities that the Indians can inspect. India, on the other hand, has over a hundred facilities that will need to be inspected and their output over the years accounted for. This asymmetry in treatment would obviously be intolerable to our Indian friends.

What India proposes instead is far from being clear. If one were to go by what Subrahmanyam has proposed in a "Times of India" article, it would be a number of small steps: Pakistan should sign the partial test ban treaty; it should also accede to the UN Conventions about environment; India and Pakistan should exchange as much data as possible on the nuclear subject; they should of course sign the India-proposed friendship treaty; and they can enter into a number of other specific agreements like hijackings, not attacking each other's nuclear facilities and finally outlawing the first use of nuclear weapons vis-a-vis each other. But Subrahmanyam is absolutely clear that both countries should keep their nuclear option open. Mutual confidence-building exercises have to be undertaken within this framework. One can safely assume that Mr Subrahmanyam's personal position as a Secretary to the Government of India should suggest that GOI's own proposals would not be much different.

Nuclear Club

It is most interesting to find him advocating the Bomb for Pakistan. A careful reading of his piece on the subject would suggest that he wishes that Pakistan should actually exercise its nuclear option, if it has not yet done so, and join the club properly. Or else, some of the benefits of the Bomb he perceives for the Pakistanis would not accrue by the bomb-in-the-basement strategy that he has eloquently suspected Pakistan to be hitherto employing. This convergence of Indian hardliners--who are most anxious for India to acquire and stockpile nuclear weapons--with Pakistani enthusiasts for the same objective is intriguing.

Indian hardliners have long held that since Pakistan has acquired the capability, let India boldly join the Nuclear Club. But since Pakistan has been bending over backwards to say that it does not wish to exercise its nuclear option and has proposed a number of measures to reassure the Indians about it, India's unilateral declaration of becoming a nuclear power would invite criticism from all peace lovers everywhere. It seems that the Indian hardliners are looking for some alibi; Pakistan's avowal of doing the deed would be an excellent cover for the Indians to come out of the shadows and proclaim that, 'much against our will, we now have to go in for nuclear arms; what can we do!' Whether or not Pakistan gets the

leadership of the Islamic World, India can then hope to become a nuclear power properly so-called--on par with France, Britain and China by virtue of its capabilities.

Should we present India the perfect alibi to go nuclear just for its asking? Before we do any such thing, let us ponder over the cost-benefit rates of exercising the opposition we have.

[20 Sep 85 p 15]

[Text]

PAKISTANI hardliners' case for becoming a nuclear power, however small, is that it will deter the potential enemy, India. If it will really produce this result, there may be reasons to recommend this course of action. But it cannot be taken for granted; it needs a close and careful look at the whole range of possibilities. Anyhow, the cost-benefit ratio should be examined in a hard-headed manner.

To be sure, hard facts are not available; a reasonably clear statement of what Pakistan's true capabilities are, or can be, is difficult to make. One can only go by rough approximations and, mostly, by what it cannot do. We also have the choice to accept the estimates going the rounds of the world Press, originating in American intelligence reports. While American CIA's capacity to gather information in Pakistan must be considerable, accepting its leaks is always hazardous.

Modest capacity

The CIA can have any number of angles and it is quite capable of presenting a deliberately or inadvertently distorted picture. But by all accounts, of friends and foes alike, Pakistan's true nuclear capabilities, when and if it does decide to exercise its nuclear option, is that of being able to fabricate a strictly limited number of nuclear devices of rather crude type per year. No one has yet accused it of having really large industrial facilities either for reprocessing spent nuclear fuel — supposing it has any unaccounted for spent fuel from the KANUP by cheating IAEA's inspectors (which is extremely doubtful) — or of enriching uranium. All our Kahuta-based capabilities can only be modest, for they are, after all, scarcely much more than laboratory-sized.

Up to a point, there is a plausibility in the argument for a Pakistani deterrent. Since it is considered to be axiomatic that peace between two neighbours can only be maintained through a balance of power — such is the received wisdom — and Pakistan feels obliged to keep a certain power parity with India. But it is finding it very hard to maintain an effective power balance with India. In the circumstances, it is thought that having a few nuclear weapons or devices, parts.

Today's power politics and its linkages make the world vulnerable to nuclear weapons being used, even though their destructive potentialities are known. One had occasion in these columns to mention one such contemplation that had been occasioned by the India-Pakistan war of 1971. This could have resulted in either the major nuclear powers — US, USSR and China — having it out with their nuclear rockets on their own territories, or more likely, on the subcontinent, each hitting against the supporter of the opposing alignment. Has anything happened since to suggest that the international linkages of India and Pakistan with major nuclear powers have disappeared? Who can say that possession by Pakistan of some nuclear devices, balanced by a huge counterpoise of India's nuclear armoury, would neither result in war nor that a possible conflict between them could not carry the potential of major powers' involvement?

There are two doubts that are difficult to be cleared. First, supposing Pakistan somehow solves the problem of delivering its nuclear charges on their targets, would any responsible Pakistani decision-maker be able to take the fateful decision either during a war or to start one thereby? The doubt arises from any number of technical factors. Supposing the intended target has been hit, what would follow? Would India not retaliate in kind more or less massively? Whatever the stage of the conflict, who would take the responsibility of the almost sure nuclear destruction in Pakistan as a result of the other side's riposts? This virtually rules out the chance of using the Pakistani devices in any actual conflict.

Apart from this, there are other initial considerations for the Pakistani decision-maker, even when he can be assured of the unlikely eventuality that there would be no nuclear response from India's side: Which Indian targets can realistically be attacked with an improvised delivery system of nuclear weapons without the fallout travelling back to Pakistan territory? Supposing the first Pakistani strike — with, say, two or three devices — is intercepted by India's quite sophisticated surface-to-air missiles, what would happen and where?

Two Doubts

Secondly, one has to revert to the already-mentioned ground of objection based on numbers. The idea of possessing nuclear weapons is more to deter the enemy than to use them. Even so, there has to be some basis for deterrence that can only be a state of mind--in their potentialities. India can only be truly deterred if it knows that either it cannot absorb Pakistan's first notional strike or it cannot countenance the consequences of its own reply (in the shape of Pakistan's second retaliatory strike). Now, it is only possible to conceive of Pakistan's first strike, although there may be problems in even visualising it. Can anyone discern a second-strike capability for Pakistan? In other words, if the Indians were notionally to reconcile themselves to the loss of their one or two cities, they can indulge in both aggression with conventional weapons and nuclear blackmail.

The simple fact of history of the last 40 years is that the increase in the number of weapons has only added to insecurity and tensions. Just as there can be no stable balance of power, the ability of nuclear weapons to deter would remain doubtful if the causes of war remain. At any rate, possession of a few nuclear devices by Pakistan, whether or not they actually deter the enemy, would certainly result in increasing tension and insecurity.

Let it, for argument's sake, be conceded that the Pakistani *'force de frappe'* does deter India. The question would be for how long? As soon as India, with its known technological resources, is able to build its own bigger deterrent, we too will be deterred from thinking of using our deterrent. In other words, on the best possible scenario, while tension is likely to go on increasing, neither side will dare use nuclear weapons. Good and proper. But what if India brings into play its superiority in conventional weapons, either for aggression or blackmailing? Moreover, can we plan on the basis of only the best scenario?

By building a less-than-credible deterrent, the next outcome may be to give India what it seems to be looking for: a chance to go nuclear without taking too much blame. The emergence of India as a big nuclear power — the wherewithal for which is available to it — will produce a change in the subcontinent that might not be welcome to Pakistani hardliners.

With the growth of Indian nuclear might, it is natural to expect two things: the first is increase in tension and in Pakistan's sense of insecurity, thanks to the asymmetry in all kinds of numbers and development. Secondly, the Indians would be greatly tempted to engage in aggression with conventional weapons while both might conceivably be deterred in using nuclear devices — the very result that the Pakistani deterrent was designed to avert. Anyhow, the idea of Pakistan exercising the nuclear option is likely to produce results that cannot be desired in the long-or short-term.

CSO: 5100/4702

PAKISTAN

GOVERNMENT STAND ON KAHUTA DEFENDED

GF091830 Islamabad THE MUSLIM in English 2 Oct 85 p 4

[Editorial: "Target Kahuta"]

[Text] The Minister of State for Foreign Affairs, Mr. Zain Noorani, has done well to categorically reiterate how sacred Kahuta is to Pakistan; an attack on it, the minister told the National Assembly, would constitute an act of war. Notwithstanding our differences with the government on many issues no less sacred than Kahuta, we consider it highly commendable that it has throughout courageously resisted pressures on our peaceful nuclear programme including occasional arm-twisting and even overt threats. Kahuta is one of the country's most precious projects and anybody who dares to scuttle it must be treated as a traitor to Pakistan. The regime has failed to rise to expectations on many a programme promised by it, more specifically, return to unadulterated democracy and the rule of law, true Islamisation and elimination of corruption. But its resolute defence of Kahuta deserves unstinted commendation. We are sure the government and the people of Pakistan will not only spare no sacrifice in defending Kahuta but will give the aggressor a befitting rebuff.

Regrettably, however, we are sometimes assailed by doubts that some of our politicians and some even among our civil and military brass may end up by compromising the country's interests just to please Washington, Tel Aviv or New Delhi in the hope of gaining entry to the portals of power. The national consensus in favour of Kahuta is irrevocable and irreversible and no referendum is needed to ascertain it. But the cause is too sacred and precious to be left only to the government, particularly one that stands distanced from its people. The government should do some hard-headed and quick thinking and take steps to make Kahuta invincible, both from within and without. The simplest and surest way is to earn the confidence of the masses. Is it too much to hope that the government will show the same courage by reposing trust in the people that it has demonstrated in respect of Kahuta?

CSO: 5100/4704

PLEA MADE FOR STEPS TO STOP ATTACK ON FACILITIES

Karachi DAWN in English 3 Oct 85 p 9

[Text] Karachi, Oct 2--Mr Munir Ahmed, Chairman, Pakistan Atomic Energy Commission has stressed the urgent need for the international community to take strong and effective measures so that no country was able to carry out armed attacks with impunity against nuclear facilities devoted to peaceful purposes.

In a statement before the 29th regular session of the IAEA general conference held in Vienna, Mr Munir Ahmed said that Pakistan fully endorsed the world-wide efforts for adopting an international convention, forbidding and preventing such attacks.

He pointed out that the unwarranted and unjustified Israeli attack on the nuclear reactor centre in Iraq in June 1981 had done an irrepairable damage to the cause of peaceful application of nuclear energy and it was imperative that Israel withdraw its threat to repeat such attacks on Iraq and other countries of the region, so that the nuclear facilities in these countries are developed in an atmosphere of security.

In this regard, he said, the leading western countries who enjoy considerable influence with Israel to ensure that it complies with Res/425, in order that this issue, which is of deep concern to the international community, is resolved in an equitable manner, without any further delay.

He strongly deplored the racial policies of the apartheid regime of South Africa which he said were directly responsible for the present serious unrest in the country and which have been universally condemned.

"In the context of the agency work we fully share the concerns expressed about the nuclear programme of South Africa. Pakistan Government oppose continuation of any nuclear, military or economic cooperation with the racist regime of South Africa," he added.

CSO: 5100/4703

PAKISTAN

PLANNING OFFICIAL TALKS ABOUT CHASHMA PROJECT

Rawalpindi THE PAKISTAN TIMES in English 2 Oct 85 p 8

[Text] Islamabad, Oct 1--The Parliamentary Secretary for Finance and Planning, Chowdhury Nasir Ali Khan, today told the National Assembly that the government had given no understanding to any super power to drop the construction of Chashma nuclear power project.

Responding to a question posed by Sheikh Rashid Ahmad (Rawalpindi), the Parliamentary secretary assured the House that the negotiations were going on and the government was making earnest efforts to accomplish the project.

Giving details of the project, he said that the tenders for the project were floated in December 1982 to seek the bids. At present the project had become a political issue and the policies of various countries were affecting it.

He said it is, therefore, not a commercial matter as the plant had to be sought from other country. Mr Nisar Ali said that it would be difficult to predict about the completion of the project unless the bids were received.

In his written answer, the parliamentary secretary informed the House that the construction of the project will commence after bids had been received. For this purpose, he added, discussions are currently going on with potential suppliers of nuclear power plants and their respective Governments.

Replying to a question asked by Chaudhry Mumtaz Ahmed Tarar (Gujrat) about the Chashma Atomic Electric House, the parliamentary secretary for finance and planning said that after Pakistan Atomic Energy Commission had entered into contracts with French companies for the supply of equipment, services and technical information, we started experiencing difficulties from the French side in the implementation of the agreement.

The French companies were officially stopped by the French Government from carrying out their contractual obligations, he said, and added that in view of this the PAEC [Pakistan Atomic Energy Commission--fbis] under the terms of its contract, has instituted claims against some of the French companies.

The government, Chowdhury Nasir Ali Khan explained, is examining all aspects of this problem, political, legal and technical, to ensure that our legitimate interests are protected. We are in touch with the French authorities regarding the non-fulfillment of bilateral commitments by France, he added.

CSO: 5100/4703

PAKISTAN

BRIEFS

ZIAUL HAQ'S REMARKS CITED--The Pakistan president, General Ziaul Haq, has confirmed that his country has successfully acquired the technology for the enrichment of uranium. In an interview to a Kerala English weekly, General Zia said that his country has the capability to transform a peaceful nuclear program into a nonpeaceful one at any time. He said Pakistan should have a completely self-sufficient nuclear fuel cycle, of which enriched uranium is an essential component. He said Pakistan will require about 20 nuclear reactors by the end of the century. Replying to questions, General Zia said one of the biggest stumbling blocks in India-Pakistan relations is the mistrust and apprehensions that each country has about the other. He said whether Pakistan has a nuclear program and whether it is peaceful or not is not relevant to our relationship at this stage. [Text] [Delhi Domestic Service in English 1530 GMT 14 Oct 85]

MINISTER ON INDIAN CRITICISM--The minister of state for foreign affairs, Mr Zain Noorani, stated in the National Assembly today that the purpose of India's propaganda against Pakistan's modest and peaceful nuclear program is to malign Pakistan and to divert attention from its own program which is not only massive in size but open to doubt about its professed peaceful intent. Speaking on an adjournment motion sought to be moved by Sheikh Rashid Ahmad, he said India has accumulated a substantial stockpile of plutonium. The Indian prime minister has admitted that India could make nuclear bomb in months or weeks. India was keeping its option open as stated by its former external affairs minister. Mr Zain Noorani said any objective observer can see that it is India which poses a real threat to nonproliferation in South Asia. The president of Pakistan, he pointed out, has time and again stated in clear terms that our nuclear program is modest and experimental and designed to meet the energy requirements of the country. He has made it clear that Pakistan does not have any atomic bomb and has no intention of making one. The mover did not press his adjournment motion. Allama Abdul Mustufa Al-Azhari, Allama Shah Iradul Haq Qadri, Mr Mohammad Usman Khan Noori, and Haji Mohammad Asghar did not press their adjournment motions. Following the statement by the minister of state for foreign affairs that the news reports about the former U.S. President Mr Nixon having expressed America's concern regarding Pakistan's nuclear program during his visit to this country, was totally incorrect [sentence as heard]. On the contrary, he said, former President Nixon had held an assurance that in his opinion the United States would not oppose Pakistan's peaceful nuclear program. [Text] [Karachi Domestic Service in English 1005 GMT 12 Oct 85]

OFFICIAL ON PACT WITH INDIA--The Chairman of the Pakistan Atomic Energy Commission, Mr Munir Ahmad, while addressing the 29th session of the International Atomic Energy Agency stated that to save South Asia from the nuclear weapons race, Pakistan is ready to hold high level talks with India, and is also ready to sign an agreement with India on the subject--an agreement acceptable to both countries. However, he stated that Pakistan was not prepared to abandon its plan to build a nuclear electricity power station and that if Western countries refused to supply the necessary equipment for the project, Pakistani scientists and engineers would continue their efforts to build a nuclear energy reactor themselves. We believe, he added, that developed countries should give up the policy of refusing nuclear technology needed for peaceful purposes to developing countries. Developing countries could speed the pace of their development programs if they could get nuclear technological knowhow from developed countries. The developed countries' treatment of Pakistan is discriminatory and one-sided, even though Pakistan is sincerely determined to use nuclear technology for peaceful purposes only. [Text] [Karachi MASHRIQ in Urdu 4 Oct 85 p 3]

CSO: 5100/4703

SOUTH AFRICA

PORT ELIZABETH MAY GET NUCLEAR POWER STATION

Two Areas Earmarked

East London DAILY DISPATCH in English 12 Sep 85 p 1

[Text]

PORT ELIZABETH — Two areas near here have been earmarked as potential sites for South Africa's second nuclear power station, the Electricity Supply Commission (Escom) announced yesterday.

The site west of Port Elizabeth stretches about 60 kilometres along the coastline from the Tsitsikamma River mouth to Cape St Francis, and is 18 kilometres deep. The second site under consideration in the area is bounded by the Sundays River mouth and Cape Padrone. It is also about 18 kilometres deep.

Seventeen other coastal sites, which were not identified, will also be investigated by Escom in an R8-million, six-year search which starts with the Port Elizabeth sites next month.

Escom's assistant senior general manager, Mr Lood Rothman, stressed at a press conference here yesterday that a decision to build a second nuclear power station had not been taken yet.

"However, it is clear that at some stage in the future more nuclear power stations will have to be built to meet electricity needs, and we must ensure that sites are identified and reserved for future use."

He said that after suitable sites had been identified they would be "put in cold storage pending further decisions. We would be looking at another nuclear power station at the end of the century."

He confirmed that a site for a second nuclear power station would have to be identified by 1988 if it were to be commissioned before the year 2000.

The projected cost of constructing a second station was estimated at about R7 000 million.

Escom officials said market conditions would determine whether the new project would be undertaken on a turnkey basis — as with Koeberg where a French consortium had been contracted. Civil works comprising 20 per cent of the Koeberg project were undertaken locally.

The sites under consideration in the Eastern Cape embrace about 62 properties. Most of the site east of Port Elizabeth belongs to the Department of Forestry, while the site to the city's west is largely privately owned.

Asked about the economic wisdom of a second Koeberg, given the unfavourable exchange rate, the current recession and a projected decline in demand for power, Mr Rothman said alternative sources of energy had to be investigated irrespective of the state of the economy.

The cost of generating power at Koeberg is an estimated 300 per cent higher than the cost of power from coal-fired stations. However, Escom believes that energy from coal will become expensive as resources diminish, while nuclear power will get cheaper.

At current consumption rates, South Africa's coal reserves will last more than 450 years.

Reaction Varies

Cape Town THE ARGUS in English 13 Sep 85 p 4

[Text] Port Elizabeth--Reaction to the news that sites to the east and west of Port Elizabeth are to be investigated for the possible construction of a nuclear power station has varied from resignation to enthusiasm.

Mr Edgar Crews, a landowner in the vicinity of the Sundays River mouth, most likely site for the power station, said today that he was right behind the idea.

"I've been writing to various bodies for years trying to tell them to build a power station there. It's the perfect place and would be a tremendous boost to Port Elizabeth," he said.

Mr Crews said the Sundays River mouth was next to a major highway, was near the main power lines of the national electricity grid and the site was a virgin area of sand dunes.

Commenting on the threat of pollution Mr Crews said this was "a load of twaddle".

Sea Life

"The prevailing winds and currents act away from Port Elizabeth along an uninhabited coastline and besides, the only change to the environment is that the water around the station is made warmer, which in fact enhances sea life."

Professor of zoology at the University of Port Elizabeth, Professor Anton McLachlan agreed that the Sundays River mouth was the most likely site for a power station.

"Naturally any installation the size of a nuclear power station will have an impact on the environment and, from an ecological point of view, it is a pity to spoil a virgin part of the coastline in any way.

"But at least, if it is established there, we will not have been caught with our pants down and will be able to limit the damage by being able to make scientifically-backed recommendations to Escom."

Port Elizabeth conservation journalist Dave Bickell disagreed, saying that much of the Tsitsikama coastline mentioned as a possible site was virtually inaccessible and the construction of the infrastructure of roads and buildings the station would need would destroy forever an area that was unique.

CSO: 5100/2

SOUTH AFRICA

KOEBERG RESUMES POWER GENERATION

Cape Town CAPE TIMES in English 17 Sep 85 p 9

[Text] KOEBERG nuclear power station generated 100 percent power for the first time at the weekend.

A statement issued by a spokesman for Escom, Mr Andre van Heerden, said full power had been generated at 10h35 on Saturday.

Mr Van Heerden said it was also the first time both units at the station were running at full capacity simultaneously and that the power station supplied its total capacity of 1 842 megawatts to the national grid.

He said the delivery of power at this level was not permanent, as unit 2 was still undergoing tests and would come into full commercial operation only after it had been taken over from the contractor, Framateg, later this year.

Take-over and commercial operation were dependent on Escom, the Atomic Energy Corporation and the Council for Nuclear Safety all being satisfied that unit 2 was operating satisfactorily.

Unit 1 of the power station came into commercial operation during July last year.

Mr Van Heerden said the Atomic Energy Corporation had also set a standard for the release of radiation from Koeberg during normal operation.

This was 25 millirem a year, a figure well below the internationally-accepted maximum level of 500 millirem a year for members of the public for all sources of radiation, he said.

(The millirem is a measure of the biological effect of radiation. The natural background radiation is about 100 millirem a year in Cape Town and 130 millirem a year in Johannesburg.)

The releases from Koeberg so far this year amounted to 0,35 millirem.

During 1984, releases amounted to less than one percent of the allowed limit, or 0,04 percent of the international standard.

He said Koeberg had produced six thousand million kilowatt hours since it first generated electricity in April last year.

To produce this energy about 400kg of uranium 235 was consumed.

This was the equivalent of three million tons of coal used at a coal-fired power station, about 40 percent of which would remain as ash.

Mr Van Heerden said water savings amounted to some 15 thousand million litres because sea water was available for cooling, rather than fresh water which would have been used inland.

This was 45 percent of the capacity of Steenbras Dam.

CSO: 5100/2

NUCLEAR ARMING OF PAKISTAN

Help from Abroad

Moscow SOVETSKAYA ROSSIYA in Russian 9 Jun 85 p 5

[Article by S. Bulantsev under the heading "A Nuclear Weapon Is Produced in Pakistan": "Tacit Connivance"]

[Text] At that time it would not have entered the minds of even the most inquisitive reporters and detectives to link the two facts: an Amsterdam court sentenced, in absentia, Pakistani citizen Abdul Qadir Khan to four years of imprisonment for misappropriation of extremely secret documents, and thousands of miles from Holland, in northern Niger, a truck with 20 tons of enriched uranium ore vanished without a trace, as though swallowed up by quicksand. However, time has shown that the two events, separated by a vast distance, are links of the same chain...

At the Urenco Company's uranium enrichment plant in Holland there very likely wasn't a single person who didn't know this charming Pakistani. His colleagues never ceased to be amazed at his astonishing diligence, and even the management more than once noted Dr Khan's zeal for work. Having studied for several years in Belgium and the Netherlands, and married to a Dutch woman, he was, it seemed, interested only in science and was as far from politics as the Andromeda Galaxy is from the supersecret atomic center in the Dutch city of Almelo, where Dr Khan worked.

"I dream of obtaining Dutch citizenship," he would say rather often to his coworkers. Dr Khan was above all suspicion. Smiling enchantingly, he would drop into hush-hush laboratories with his notebook, jotting down notes. "He's making a career," the Dutch would whisper to one another. "What a glutton for work!" they would exclaim, almost delightedly, when Khan would take secret papers home.

Their astonishment was without bounds when in 1976 Khan suddenly renounced a brilliant future at Urenco, quickly packed his things and departed for Pakistan.

It soon became known that Khan had taken over as head of an atomic research program in the little town of Kahuta, not far from Islamabad. He started

corresponding with his former colleagues at Urenco and received information from them on questions of interest to him. This most successful scientist ordered from a Dutch firm more than 6,000 tubes made of special types of steel. These tubes are used in facilities for uranium enrichment by the centrifuge process. Pakistan obtained the tubes as easily as if they were sewing machines.

Not until several years later was there an explanation for the hasty departure of the charming Dr Khan from the firm in which a brilliant career awaited him. The Dutch authorities established that the Pakistani had made off with highly secret documents, in particular the drawings for the design of a new uranium enrichment plant and many technological secrets. For a long time after this, people in the Urenco laboratories shook their heads in bewilderment: "Well how about Dr Khan, he turned out to be a spy!"

The Amsterdam court instituted criminal proceedings against the Pakistani and sentenced him to four years in prison. But so what? It didn't affect him. What court could reach him in carefully defended Kahuta?

At approximately the same time something strange happened to the missing truck. The vehicle was loaded at a uranium mine in Arlit and departed for the port of Cotonou, which is located 1,500 miles to the south. From there the cargo was to go on to France. But the truck did not reach Cotonou. And despite thorough searches, not even tracks of its tire treads were found. But then suddenly it was discovered where it definitely was not supposed to be--in the opposite direction from Cotonou. The uranium showed up at the project in Kahuta. In this same illegal manner, as experts later determined, Pakistan through intermediaries obtained from 110 to 200 tons of enriched uranium ore.

The spy horrors didn't end with this. Pakistani agents several more times were found to be involved in attempts to obtain illegally components necessary for production of an atomic bomb.

Last year in Houston a certain Pakistani was arrested for attempting to export illegally to his country 50 electronic switches used in the production of atomic bombs. However, just a few weeks after his arrest he was freed and allowed to go home in peace, as far as possible from the ubiquitous journalists. And how did Islamabad react to this scandalous disclosure? General Zia-ul-Haq affirmed that the switches were intended for rotating flashing lights, "like those that are installed on the roof of ambulances." The general was not the least bit embarrassed by the ridiculousness of such a statement. He so assiduously "concerns himself with the health" of the people, whom he deprives of elementary human rights, that the story of a theft of switches was repeated this year. And here is something noteworthy: the U.S. State Department again deported an agent who was caught red-handed--a certain Nazir Ahmed Vaid, who by American law should have been sentenced to 12 years in prison. In Islamabad the authorities recently received him as a national hero.

The facts show that Washington, if not directly, then indirectly, is helping the Pakistani generals to realize their nuclear ambitions. According to information from the Indian press, Zia-ul-Haq was informed that America not only would look the other way in case of a nuclear test, but might even provide active assistance. A revelation by American Secretary of Defense C. Weinberger is well known: "For America it is vitally important that a Pakistani nuclear bomb be in the hands of a friendly government." And certainly the present regime in Islamabad is one of the most obedient satellites of Washington. In a recent interview Indian Prime Minister Rajiv Gandhi accused the U.S.A. of tacit connivance with Pakistan. "Pakistan is very close to producing a nuclear weapon or already possesses one," the Indian leader emphasized.

Indeed, Islamabad has bought, stolen or obtained by other subterfuges the equipment and technology to produce an atom bomb. According to information from the well-informed Delhi newspaper TIMES OF INDIA, one must not exclude even the possibility that Pakistan has already tested its nuclear weapon "in one of the countries friendly to it." In any case Abdul Qadir Khan openly states that Pakistan is in a position to make a hydrogen bomb, not just an atomic bomb.

The inevitable question: Why a nuclear weapon for Islamabad? Certainly its military preparations even without one have greatly exceeded any reasonable requirements for defense. It will be recalled that within the framework of the military and economic deal with Washington Pakistan receives tremendous quantities of the most modern arms, including F-16 fighter-bombers capable of delivering nuclear bombs to their targets. Who is threatening Pakistan's security? Journalists have more than once put this question to Zia-ul-Haq, but they have not received any convincing answer. This is not surprising, because the real threat to its sovereignty does not by any means come from without. The adventuristic course of the regime, which has become the principal tool of American imperialism in southern and southwestern Asia--this is the real danger. Wrapped up in the billions of dollars of military contracts, the country is losing its independence. Against the will of its people it has found itself drawn into Washington's dirty war against Afghanistan. Islamabad has obviously forgotten a simple truth: The one who gets burned is not the one who gets the chestnuts on his table, but the one who pulls them from the fire.

Apprehensions and Charges

Vilnyus SOVETSKAYA LITVA in Russian 23 Aug 85 p 3

[Article by M. Zhukas under the rubric "Notes from Our Observer": "A Nuclear Center by the Old Temples"]

[Text] Kahuta is a small town located not far from the capital of Pakistan, Islamabad. Until recently foreigners staying in Islamabad often had picnics there. But now this heavenly spot has lost its attractiveness. Around the old temples the roads are blocked. All the routes to Kahuta are guarded by

tanks. Ground-to-air missiles and antiaircraft guns are pointed at the sky. "There is a widespread opinion that this complex is the nerve center of Pakistan's persistent efforts to produce a nuclear weapon," the English newspaper FINANCIAL TIMES wrote recently. Preparations for production of its own nuclear weapon is only one feature of the present policy of the dictator-general.

In order to understand better the processes that now determine the situation in Pakistan, it is necessary to return to events going back eight years. In 1977 there was a military takeover in the country. Prime Minister Z. A. Bhutto was arrested and later executed. Many observers considered that the charges against him were fabricated by the head of the new regime. The military administration turned the course of the country sharply to the right: political parties were prohibited and the operation of the constitution was suspended. Brutal persecution of enemies of the regime started and is continuing. People are subjected to medieval flogging, are thrown into prison and are shot.

Several years ago the present rulers of Pakistan inquired in the West about support supposedly for the purpose of overcoming economic difficulties. The U.S. administration handed Pakistan 3.2 billion dollars in the guise of a complex economic deal. However, these funds went for military purposes, particularly the production of its nuclear weapon.

Recently Pakistani Minister of Foreign Affairs Sahabzada Yaqub Khan made his usual journey to Washington. A gift had been prepared for his arrival: it was announced that there would be a speedup in the delivery to Pakistan of 500 Sidewinder missiles promised in a previously concluded deal. These missiles not only are important in themselves but also are intended for the F-16 fighter-bombers purchased in the U.S.A. Stinger antiaircraft missiles will be delivered as well. The anti-Soviet direction of American policy also must not be ignored in Pakistan. Recently it was reported that Washington intends to install Pershing-2 missiles on Pakistani soil. Indeed, the U.S.A. has no other approach to Soviet territory from the south. Washington also is financing and supplying with arms Dushman bands based in Pakistan and moving against Afghanistan.

Recently Islamabad obtained in the U.S. a large lot of krytrons--special electronic devices used in the detonators of nuclear bombs. It is worth noting that the sale or delivery of these devices is not permitted without a license from the U.S. State Department. And the fact that the deal took place despite this is one more piece of evidence that Washington is encouraging Islamabad's nuclear ambitions.

Why has Washington needed such tactics? The fact is that secret U.S. aid to Pakistan to satisfy its nuclear ambitions had long ago become an open secret. The U.S. is openly seeking to convert Pakistan into its military partner in Southeast (sic) Asia; it could become an American tool in the region of the Indian Ocean and the Persian Gulf and unleash still greater activity in the undeclared war against Afghanistan.

Pakistan's excessive armaments, which are completely out of proportion to its defense needs, evoke legitimate fears in neighboring countries, especially in India. These nations are put on their guard by the transformation of Islamabad into a policeman of international imperialism, armed from head to toe. The impression is being created that all this is being done to distract the people in Pakistan itself from the struggle for their rights, to lull them to sleep and thus to strengthen the present dictatorship, which stands in the service of Washington.

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CSO: 5100/7

SPAIN

CHARACTERISTICS, TIMETABLE OF 'TRILLO I' POWER PLANT

Madrid LUZ Y FUERZA in Spanish May-Jun 85 pp 18-24

[Excerpt] Trillo I

The Trillo I Nuclear Power Plant is a thermal plant which will generate electricity from nuclear fuel. It is located in Guadalajara province and is owned by UEFSA [Electric Union-Fenosa, Inc] and ENDESA [National Electric Power Enterprise, Inc].

The plant is included in the plans with a 1992 horizon, which are now being developed under the PEN [National Energy Plan] that the government approved on 27 March 1984. These plans call for the plant's start of operation during 1988, after the required tests and inspections have been conducted, and the authorization for startup is issued. Earlier, Trillo I received the requisite preliminary permit (on 4 September 1975) confirming the site selected, and the construction permit (17 August 1979), which allowed the official start of construction.

The Trillo I plant is being equipped with a PWR [Pressurized Water Reactor] system with an installed power of 1,041 electric MW. Under normal operating conditions, this will provide a production of about 6 billion kWh per year. The reactor is what is known as a third-generation reactor, providing vanguard technology in this field. It is of German design, by KWU [Kraftwerk Union], although a large part of its components, like the rest of the plant (the container, steam generators, pipes, pressurizer, etc) are of Spanish manufacture.

Trillo I is designed as a "basic power plant." That is, it is a plant which will be used in uninterrupted operation, and which will consequently be capable of providing an installed power with constant readiness for use. This type of plant, combined with coal-burning thermal plants, will cover the average daily electricity demand, while it will also permit suitable management of Spain's water and oil-based plants, which will be reserved to meet the peak demands that occur throughout the day. In addition, this type of plant will help to offset the variations in water flow to which Spain's rivers

are subject. Finally, such plants will offer a cheap and efficient substitute for hydrocarbons in generating electricity, thus making a decisive contribution to the attainment of the objectives of our energy policy and to the correction of our balance of payments deficit. When it begins operation, the Trillo I Nuclear Power Plant will help Spain to save 1.5 million tons of oil a year.

Site

The place chosen for the plant is located in the area known as "Cerrillo Alto" within the municipal limits of Trillo, on the right bank of the Tagus River, at an elevation of approximately 100 meters above the river level. The site is 93 kilometers in a straight line from Madrid, 47 kilometers from Guadalajara, and 80 kilometers from Cuenca. The two closest populated arcas are the towns of Trillo and of Gargoles de Abajo.

The site was chosen after a careful study in which both economic and technical factors were weighed and combined. The nearness of the site to large energy-consuming centers, primarily Madrid and the industrial areas of Guadalajara and of Alcala de Henares; the proximity of a body of water with the features of the Tagus River; and the geological and seismic conditions of this area were all essential criteria in the final selection. Trillo I is located in an area with a seismic intensity rating of V on the MSK scale. According to Spain's standards, Level VI is the upper limit which defines areas of low seismic activity.

In addition, the demographic and socioeconomic conditions of the surrounding area showed a sufficient capacity to provide an infrastructure capable of supporting an industrial facility with these features.

Main Buildings

The Trillo I plant is a complex of buildings whose design criteria, based on existing regulations, are most rigid when required by the types of systems, equipment and components they house. The major structures are the following.

Reactor Building

The reactor building is made of reinforced concrete; its outward appearance is a cylinder capped by a hemisphere. Inside, the building houses a spherical enclosure 53 meters in diameter, formed of a steel plate with an average thickness of 32 mm, which completely insulates this area from the exterior, making it a tightly sealed structure. Inside this enclosure are found the reactor's container, the pressurizer, and the steam generators, along with the rest of the components of the reactor's cooling system.

The metal sphere is crossed by a series of concrete points, called penetrations, used for the passage of various cables and pipes. There are

also three hermetically sealed locks which provide access for both equipment and personnel to the interior. These penetrations and locks are designed to maintain the area's leakproof seal.

The building rests on a concrete slab foundation 2 meters thick. This area, along with the part of the cylinder that is buried underground, has been made impenetrable both to the action of outside water and to the release of liquids to the exterior.

Auxiliary Building

Adjacent to the reactor building, the auxiliary building houses the parts of the auxiliary system of the steam generating system that are not directly involved with the shutdown and maintenance of the reactor in a safe state, as well as the precision control and regulation systems required for proper operation of the plant. Part of this building is used for temporary storage of radioactive wastes. The building is made of reinforced concrete and its foundations rest on a single slab.

Electrical Building

This building houses the plant's control room with its electronic regulation system and the related process control systems, as well as most of the plant's systems for the handling, control, and transmission of electricity throughout the plant. It is made of concrete.

Emergency Power Supply Building

The emergency power supply building is located near the reactor building and it incorporates the same seismic design features as the reactor building itself. This building houses the most fundamental components of the emergency power supply system. This is a backup system that takes over the cooling function if the secondary system should be out of service. The building is a concrete structure.

Diesel Fuel Building

This houses diesel generators that provide independent electricity generation to supply vital points in the plant in situations in which the plant may be cut off from its external power supplies. Like the other structures already described, this building is also made of concrete.

Turbine Building

Located near the reactor building, this is a metal structure resting on a concrete slab. It houses the turbogenerator complex, the turbine condenser, and a number of systems related to their functioning.

Other Buildings

In addition to the buildings we have already described, the plant has other facilities used for a variety of auxiliary functions: an office building, warehouses, pump houses, water storage pools, etc. Because of their huge size, we should make special mention of the cooling towers. These concrete towers are shaped like a hyperboloid. They are used to cool the turbine condenser in order to create a minimum impact on the Tagus River.

Chronological Data on the Current Status of Construction

Below we will describe a number of the milestones reached during the past 6 months, which have been well publicized, given the importance and complexity of this project.

There can be no doubt at all that one of the biggest problems in this type of construction is the transport of some of the parts and equipment intended for creating the final product, such as electricity and materials which, because of their extraordinary size, have to be conveyed from their place of manufacture to their final destination in the plant, by employing techniques that are sometimes highly complex, and which always demand extremely careful planning.

For example, in recalling that the alternator stator weighs 447 tons, the reactor container is 6.5 meters in diameter, and the water storage tank is 32 meters long, and that, except for the latter piece of equipment, which was made by Villaverde in Madrid, they have had to be moved from their place of origin in the Nuclear Equipment factory in Maliano (Santander) to their final destination in the heart of Spain's Alcarria area, it is hard to even imagine the calculations used to overcome the numerous obstacles involved, ranging from a lack of adequate roads--aggravated by our mountainous terrain--up to the design of the means of transport suitable for moving them about on land, which have had to be developed during this operation.

To summarize, we will conclude by saying that for this successful endeavor, given the difficulties of access by road from the Cantabrian docks, either from the Atlantic (mountain passes and the crossing of wide and deep rivers such as the Duero and the Ebro) or from the northern Mediterranean (because of the latter river mentioned), the plant's departments of quality control and of supplies and transport, which were in charge of this job, working directly with the transport firm selected, finally chose unloading at the city of Alicante as the most feasible route. The transport was carried out from there, by using some connections with the Valencia-Madrid highway. Earlier, considering such future difficulties, between 1980 and 1982 a series of road improvement projects were carried out in order to facilitate the transport of these components to Trillo I. As an example, in Guadalajara, Highway C-204 was improved and widened; the same was done at a number of points along

the route through the provinces of Alicante, Albacete, Cuenca, and Madrid. In addition, a new bridge was built at Gargoles de Abajo, and 300 telegraph, telephone, and electricity lines that might interfere with this route were raised.

For the transport equipment, two special tractors made in Kansas City were purchased from the United States. Each has a 700-hp engine. A special platform was made at Mollet del Valles in Barcelona, 28 meters long and 4.5 meters wide, with independent steering to provide more maneuverability for its 18 axles.

The total weight of the tractors and platform is 200 tons.

Between May and June 1983, there was a trial transport with a load of a volume and weight similar to what would have to be hauled later. This proved the complete viability of this project. In December 1984, this began to take on reality with the transport of various pieces of equipment, including the alternator stator.

In independent operations, the water supply tank was shipped from Villaverde and the three main transformers were shipped from the Matillas station located in Guadalajara province.

In January 1985 the job of positioning and leveling the control room's framework began. This framework will house the various control panels, integrated in a complex of modules arranged in place ready to be connected later. The control room has a main control station (consisting of a control board and an instrumentation panel) and a secondary station designed for conventional elements. Both have the responsibility to inform, control, monitor, and protect the plant's operating conditions.

There were two noteworthy events in February: the completion of construction of the diesel building, in which 1,300 metric tons of reinforcement, 7,300 m^3 of concrete, and 10,800 m^2 of framework were used. Four large diesel generators will be installed there to supply backup electricity, as well as another four generators for the water and power supply. The building's structure is made of reinforced concrete, consisting of five parallel walls on a single slab foundation; its covering slab is also made of concrete.

At the same time, the electronic bays were installed in the computer room, located in the plant's electrical building. This room, composed essentially of three computers to be used for supervision, assessment, and monitoring of reactor protection system, will monitor and record the course of the operations process, not intervening directly in this process, since it determines the characteristic data for the plant's operation, using the data provided by the control room instrumentation.

In March 1985, the job of enclosing the top of the turbine building was finished. Its vertical walls were also completed at the same time.

The area of the top of the turbine building totals 3,860 m^2, and the area of the side walls 8,861 m^2. This covering of the walls (identical to what will be used for some other buildings, such as the diesel building, the auxiliary building, etc) consists of a double metal panel made of aluminum. Inside this panel is placed a 6-mm thickness of glass fiber insulation.

In April 1985 construction of the ventilation stack was completed. For this job, 150 tons of reinforcement, 1,700 m^3 of concrete, and 3,300 m^2 of framework were used.

The stack has three different parts: the first part, the lowest part, is made of a foundation slab and the first truncated cone section. The other two parts are composed of another two superimposed truncated cones. Its essential purpose will be to provide ventilation for a number of the plant's buildings. Its height is 100 meters, plus 11.50 meters of foundaton structures.

Bearings for the condensation system were also installed. These are 44 casings composed of two springs each. They were placed under the wells of the condensation system, or cold source of the secondary circuit, ready for the final positioning of this system.

Work on the well casings was also completed. This involved placing over 62,000 titanium alloy pipes in this condensation system.

The three chambers into which the condenser is divided are located in the part immediately below each low-pressure turbine chamber, and are welded to them. The purpose of this condensation system is to collect the steam escaping from the low-pressure turbine and, once it has been condensed, to send it by the condensate pumps to the water storage facility, thus completing the water-steam cycle that takes place in the plant's secondary circuit.

During the same month authorization was issued to install the electricity transmission lines that will link Trillo I to the Loeches substation, so that its production will be connected to the national electricity network.

Its total length is approximately 80 kilometers; along its path it will cross through the municipal limits of 26 towns in Guadalajara province. The budget required for its completion is estimated to be 1.831 billion pesetas.

In May of this year the job of covering the side walls of the electrical building began. During this work, over 1,700 m^2 of a double folded plate of aluminum will be installed, with an insulating internal filling of 4,800 m^2 to be used for the total job.

The electrical building is a reinforced concrete structure with ten floors, including the top. Two of its floors are underground and eight are aboveground.

These floors will house primarily cables, motor controls, transformers, etc.

Work was also started on the construction of the concrete hemisphere that will cover the reactor building's metal sphere. It was calculated that 10,700 m^2 of framework, 4,300 m^3 of concrete, and 830 tons of reinforcement will be needed to complete this hemisphere.

Resting on a 3.5-meter concrete slab, the concrete structure which this metal sphere will top will be 50 meters tall. This building, considered one of the plant's most characteristic, will house the primary circuit components. The metal sphere was designed to withstand pressures 5 times greater than atmospheric pressure.

Last June the three rotors for the plant's low-pressure chamber were installed. These chambers or turbine revolution devices are 9 meters long and 3 meters in diameter. Each weighs 86 tons. A series of vanes or propeller blades abutting its central axis will rotate constantly, driven by the water vapor from the heat exchanger, which will strike these rotors, thus producing mechanical energy. Later this energy will be transformed into electrical energy, by means of the alternator or electrical generator located next to the turbine's three low-pressure chambers.

Technical Data

Power

Reactor's thermal power	3,010 MW (th)
Steam generator's thermal power	3,027 MW (th)
Gross electric power	1,041 MW (e)

Reactor Core

Core diameter (equivalent)	3,453 mm
Core height (active)	3,400 mm
Total weight of uranium (initial loading of core)	93,901 kg
Enrichment levels (initial loading of core)	3.2%, 2.5%, and 1.9% weight of U 235

Fuel Elements

Number of fuel elements	177
Total length	4,185 mm
Weight of one fuel element	730 kg
Fuel	UO_2
Number of rods	236
Cladding material	Zircaloy 4

External diameter of cladding	10,75 mm
Internal diameter of cladding	9.3 mm
Diameter of fuel pellet	9.11 mm

Control Rod Assemblies

Number of control assemblies	52
Number of control rods in one assembly	20
Length of absorbent material	3,259 mm

Reactor's Cooling System

Number of cooling circuits	3
Total flow of coolant	15,875 kg/s
Temperature at reactor intake	292.9°C
Temperature at reactor outlet	325.7°C
Service pressure	158 bar

Reactor's Pressure Container

Internal diameter	4,878 mm
Wall thickness	245 mm
Total height	11,039 mm
Design pressure	176 bar
Design temperature	350°C
Net weight (without internal components)	429,000 kg

Steel Containment Structure

Diameter	53 m
Wall thickness	38 mm
Design pressure	5.3 bar
Design temperature	145°C

Turbine

Steam condensation, with one high pressure chamber and three low pressure chambers (double flow)	
Rotation velocity	3,000 rpm.
Main steam pressure at turbine intake	68.6 bar

Alternator

True power	1,041 MWe
Power factor	0.9
Frequency	50 cps
Voltage at terminals	27 kV

7679
CSO: 5100/2581

SPAIN

CHARACTERISTICS, TIMETABLES OF 'ASCO I, II' POWER PLANTS

Madrid LUZ Y FUERZA in Spanish May-Jun 85 pp 33-36

[Excerpt] The Asco Power Plant

Here we will describe a plant, Asco II (or to be more precise, two plants Asco I and II. As they are twin plants, what we say about one will be true for both). This plant belongs to what is known as the "second generation"; its forthcoming start of service--we hope it will match the unbeatable record of Asco I--will be added to the list of those scheduled for the Catalan area, where nuclear electricity production is already on the way to outdistancing the remaining conventional sources of producing electricity. We are sure that in the future this emphasis on nuclear power will become even stronger.

Because of the special features and vanguard technology of the Asco II Nuclear Power Plant, it serves as a noteworthy model within Spain's nuclear program.

In this article we wish to congratulate its promoters and technical staff who have made possible the scrupulous compliance with all the time and operational requirements included in the plant's design. The plant is nearly about to begin service now.

Each unit consists of a PWR [Pressurized Water Reactor] nuclear reactor with a thermal power of 2,696 MWt. The gross electric power of the plant will be 930 MWe. The condenser is cooled by water from the Ebro River, with cooling towers used before discharge back into the river.

The NSSS [Nuclear Steam Supply System] and the turboalternator were supplied by Westinghouse.

The design was done by the U.S. engineering firm, Bechtel, and the Spanish companies INITEC and INYPSA [expansions unknown], working together to form a Project Engineering Office.

Major Systems

The two fundamental systems of the Asco Nuclear Power Plant are the nuclear steam generating system and the electricity generating system, the same as in any thermal power plant.

The first of these two systems consists of a pressurized water reactor, a reactor cooling system, and the auxiliary and safety systems.

The reactor cooling system consists of three loops connected in parallel to the reactor container; each has a reactor coolant pump, a steam generator, and pipes and tubes. An electrically heated pressurizer is connected to one of the loops.

The electricity generating system, which is the plant's second fundamental system, consists essentially of the turbine, the generator, moisture separators-superheaters, the condenser, and the condensate heating circuits and water supply circuits.

The system operates in the following manner:

The energy generated in the reactor core is extracted and transported by the reactor cooling system which operates at high pressure in a closed circuit; it is transmitted to a secondary circuit by the steam generators.

The steam drives the turbine to which it is conveyed through the secondary circuit pipes. A generator is connected to this turbine; the generator delivers the electrical energy produced to the network, after its voltage is stepped up in the main transformers.

After its passage through the turbine, the steam returns to a liquid state in the condenser, again going to the secondary side of the steam generators driven by the condensate and water supply pumps. There it will again be vaporized, thus completing the circuit.

General Layout of the Plant

The Asco Nuclear Power Plant is located on the right bank of the Ebro River in Tarragona province, inside the municipal limits of Asco, about 55 km in a straight line from Tarragona. The area left by a bend in the river between Flix and Asco was used for the plant's site.

The area carved out by this river bend is divided into two parts; one between National Highway 230 and the railroad from Madrid to Barcelona via Caspe, and the other located beteen the railroad and the river.

All of the plant's facilities are located in the part located between the highway and the railroad, with the exception of the cooling water intake and discharge facilities and the cooling towers, which are in the area between the railroad and river.

Each unit occupies a leveled platform of about 200 x 150 meters, in which most of its major buildings are located. These include the:

reactor building;
control building;
auxiliary building;
fuel building; and
turbine building.

Containment Building

This is a cylindrical structure with walls made of reinforced concrete, "post-stressed" on a base slab of reinforced concrete and with a dome, also made of reinforced concrete and "post-stressed." Its internal dimensions are approximately 40 meters in diameter by about 59 meters in height. Its walls are over 1 meter thick.

Inside this building are housed the major components of the nuclear steam production system, the reactor container, the steam generators, the reactor coolant pumps, and the pressurizer, placed in different compartments shielded with concrete, along with some auxiliary and safety equipment, such as tanks, heat exchangers, air cooling and filtration units, and equipment for fuel transfer and loading operations.

On top of the reactor container is the refueling cavity that is filled with water while extracting depleted fuel and reloading with new fuel.

Under the dome is a polar crane used both to bring in new pieces of large equipment and for its later maintenance.

The building is designed to withstand the internal pressures created by a hypothetical accident and to contain the radioactive products that might escape from the reactor cooling circuit during such an accident. For this purpose, it is covered internally with a steel plate approximately 6 mm thick which provides a tight seal. Like all the buildings affecting the plant's safety, it was also designed to withstand any foreseeable seismic occurrences at the site.

Auxiliary Building

Built of reinforced concrete, it has six rectangular floors, four of them located below ground level. Its dimensions on the main floors are approximately 73 x 37 meters; the two lowest floors are somewhat smaller.

Inside the building are housed components of the auxiliary and safety systems (technological safeguards) as well as radioactive waste treatment systems and the air conditioning and filtration equipment for the building itself. This equipment--the pumps, tanks, filters, demineralizers, heat exchangers, along with the pipes and valves that make up the circuits--are distributed in many different compartments in the building; their walls provide adequate shielding during the plant's operations.

Between this building and the containment building is a penetration area, through whose three levels pass the pipes going into the containment building. The major piece of equipment here is the air conditioning system for the containment building.

Control Building

This is a rectangular structure made of reinforced concrete. It has four floors of approximately 60 x 36 meters. Two of these floors are below ground level.

The building serves as the control center for all the plant's operations. It receives operational signals and measurements from the plant's equipment and systems. It transmits orders for the modification of any procedures. This process is highly automated, and includes the assistance of the computer in the Control Room, where the plant's indicators and controls are located.

This room is designed to remain perfectly inhabitable, both during normal operations and also in the event of a hypothetical accident.

In addition to the control room, the building contains the centers that will provide electrical service to the plant's equipment, and also the conduits, trays, and ducts for the large quantity of cables and wiring designed to transmit operational and control signals between the Control Room and the entire plant.

Fuel Building

This is a building with just one floor, made of reinforced concrete with a metal structure. It contains several pits or pools, about 15 meters in depth.

New fuel is unloaded into this building, where it is stored dry in one of the pits. At intervals of approximately once a year, new fuel elements are inserted in the reactor, after spent fuel elements have been removed from it. These transfers are done by means of a fuel transfer tube which provides access between this building and the containment building's refueling cavity. Upon arrival in the fuel building, spent fuel elements are stored underwater in a pool.

After a period of time spent in the pool, used fuel elements may be transported either by road or railroad for reprocessing or final storage. During this procedure, the fuel elements are placed in containers which shield and protect them, and which, for this operation, are placed in a shaft that is also filled with water. A traveling crane is used to load and unload the containers.

Turbine Building

From a structural point of view, the turbine building is a conventional building made of reinforced concrete with a metal superstructure. It has a rectangular floor area 83 x 50 meters, and contains three floors.

This building houses the main components of the plant's electricity generating circuit: the turbine, generator, condenser, condensate heating circuits, and water supply circuits.

The turbine is a conventional unit with three chambers, 1,500 rpm connected in tandem. To dry and superheat the steam, four moisture separators/superheaters are placed between the high-pressure chamber and the two low-pressure chambers.

The generator is connected directly to the turbine; its stator is cooled by water and its rotor is cooled by hydrogen. The electrical energy produced is conducted through the insulated phase rods to the main transformers, and from these transformers, to the network.

The circuit is completed by a single-pitch area condenser divided into two chambers, four condensate pumps that draw in the water from the condenser and drive it through five stages of low-pressure heaters to two supply pumps driven by turbines, which will again take it to the steam generators after a high-pressure heaters stage.

For maintenance of this equipment, there is a traveling crane that can be moved longitudinally in the building's bay.

Water Circulation System

The condenser is cooled by water from the Ebro River, which is immediately returned to the river after use. This is a separate and independent circuit, called the water circulation system.

The water is taken from an open canal which goes to an intake structure where the water circulation pumps are located. These pumps will drive the water through large-diameter reinforced concrete pipes to the condenser.

Upon its outlet from the condenser, the water also passes through reinforced concrete pipes to the discharge structure, from which it again goes into the river.

In order to make certain that the heat produced during the cooling of the condenser will never produce a more than 3°C increase in the river temperature, between the condenser and the discharge outlet there are two parallel rows of cooling towers. When a decline in the river flow warrants it, they may be used in an open circuit or in a closed circuit, and either one or both of the rows of towers may be used.

Current Status of the Asco I Unit

On 5 July of this year, there was a scheduled shutdown in order to carry out the refueling of this unit. The total length of time required was estimated to be approximately 5 weeks.

Until that date, the unit had been connected to the national network at full power during 171 days of uninterrupted operation. This is an excellent performance, and stands as a record for Spain's second generation plants.

It is of interest to note that, since the date of 14 January when it was newly connected to the network, its load factor has exceeded 97 percent, while the electricity generated was somewhat more than 3,700 GWh.

Asco II

The General Energy Office issued a provisional operating permit for Asco II on 22 April 1985.

At that time, the director of the plant, Ignacio Camps, told the press that within approximately 3 months from that date, Asco II should be able to produce electricity, and at the end of 6 months, it should be ready to provide energy to the network, so that production at Asco II would be feasible by the end of 1985.

After the CSN's [Nuclear Safety Council] inspection of the technical work on 1 May, fuel loading began. It was completed 4 days later. The testing program then continued, and on 29 May the heating of the unit began, after the CSN had issued the appropriate permit.

During June the testing program continued, prior to reaching the initial critical point.

At the present time, authorization from the CSN to make the reactor go critical is pending; in the meantime, the various steps already reached in the startup sequence are being evaluated. The inspections required prior to reaching the milestone of going critical, which could take place during the second half of July 1985, have all been passed with great success.

The CSN-Catalan government agreement was signed on 6 May 1985 as a ratification of the agreement earlier signed on 15 June 1984; it has temporarily been frozen while waiting for the Catalan government to obtain the resources needed to exercise its inspection functions. We may therefore assume that in the future, both these plants and all the other plants in the Catalan region will, once they are in the production phase, be inspected by the appropriate authorities charged with this responsibility by the Catalan Autonomous Government.

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